

# The Mining Journal

Established 1835

Railway & Commercial Gazette

Vol. CCXLI No. 6173

LONDON, DECEMBER 11, 1953

PRICE 8d

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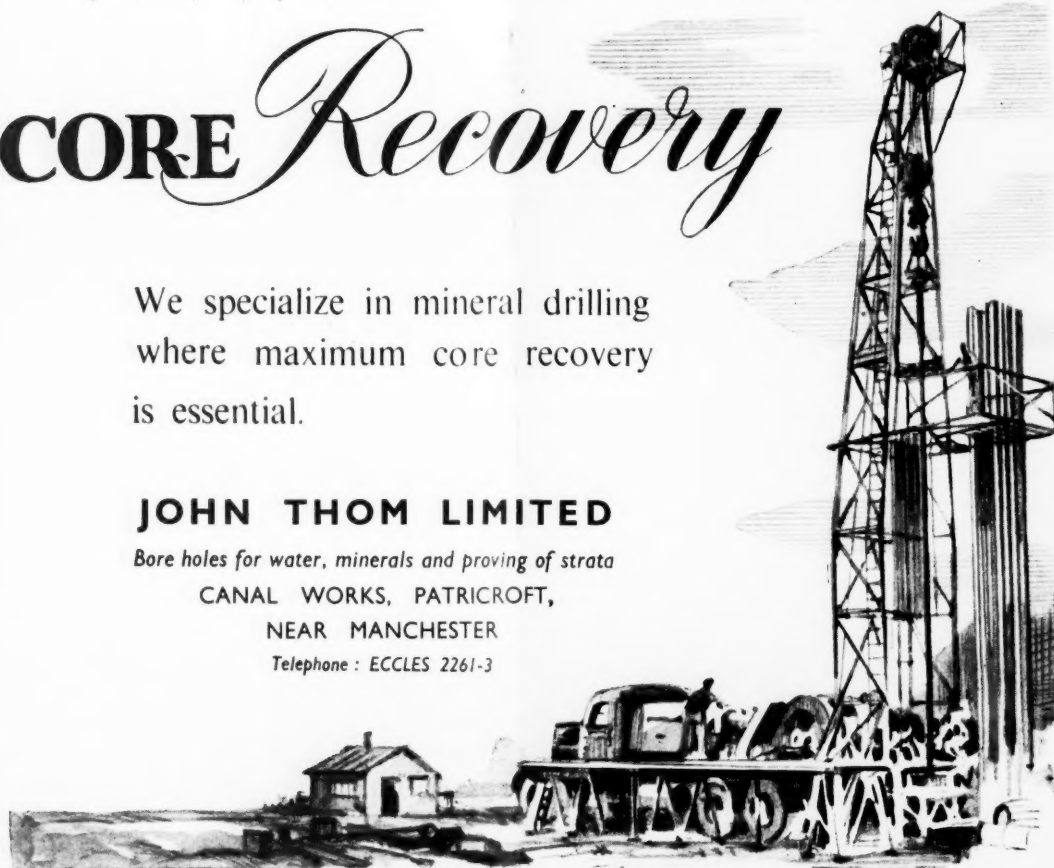
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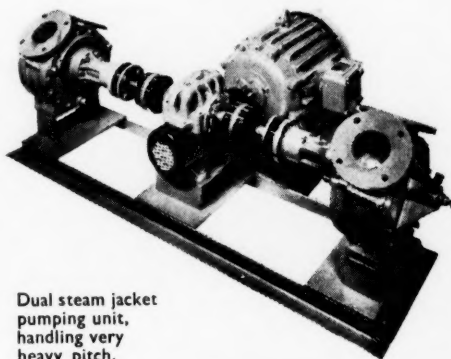
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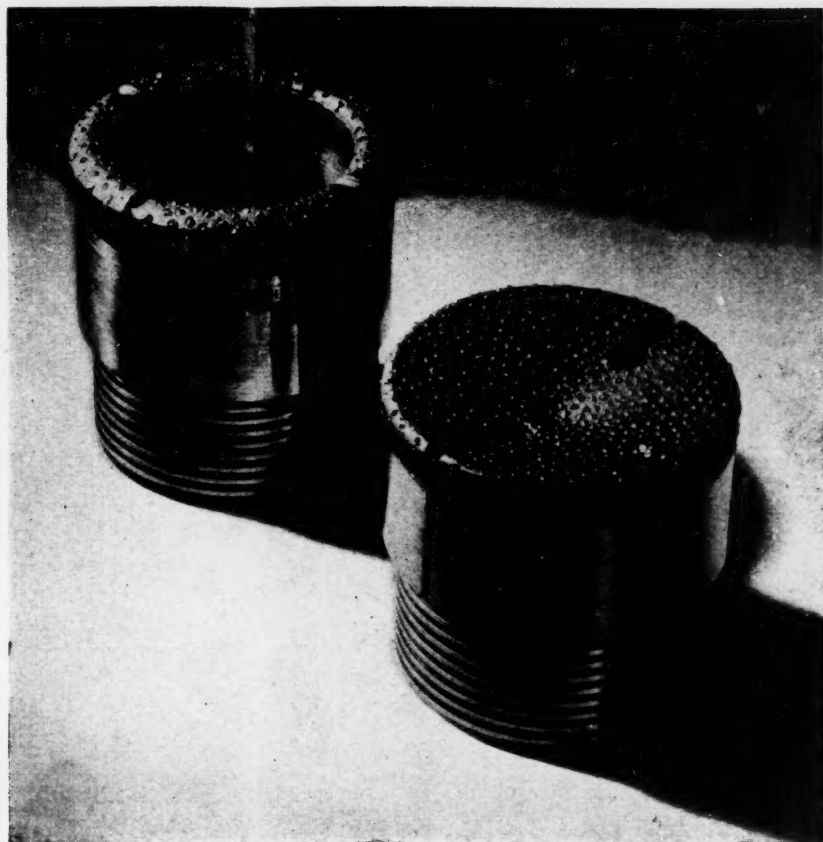


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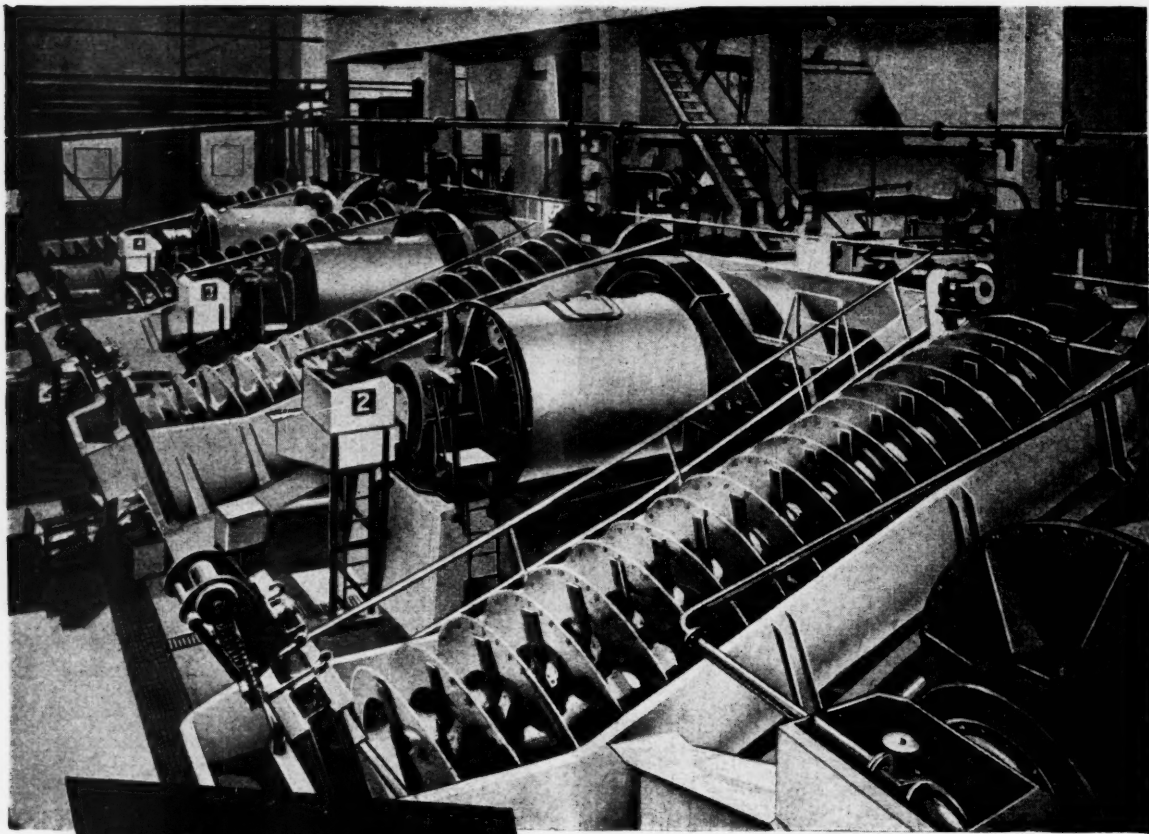
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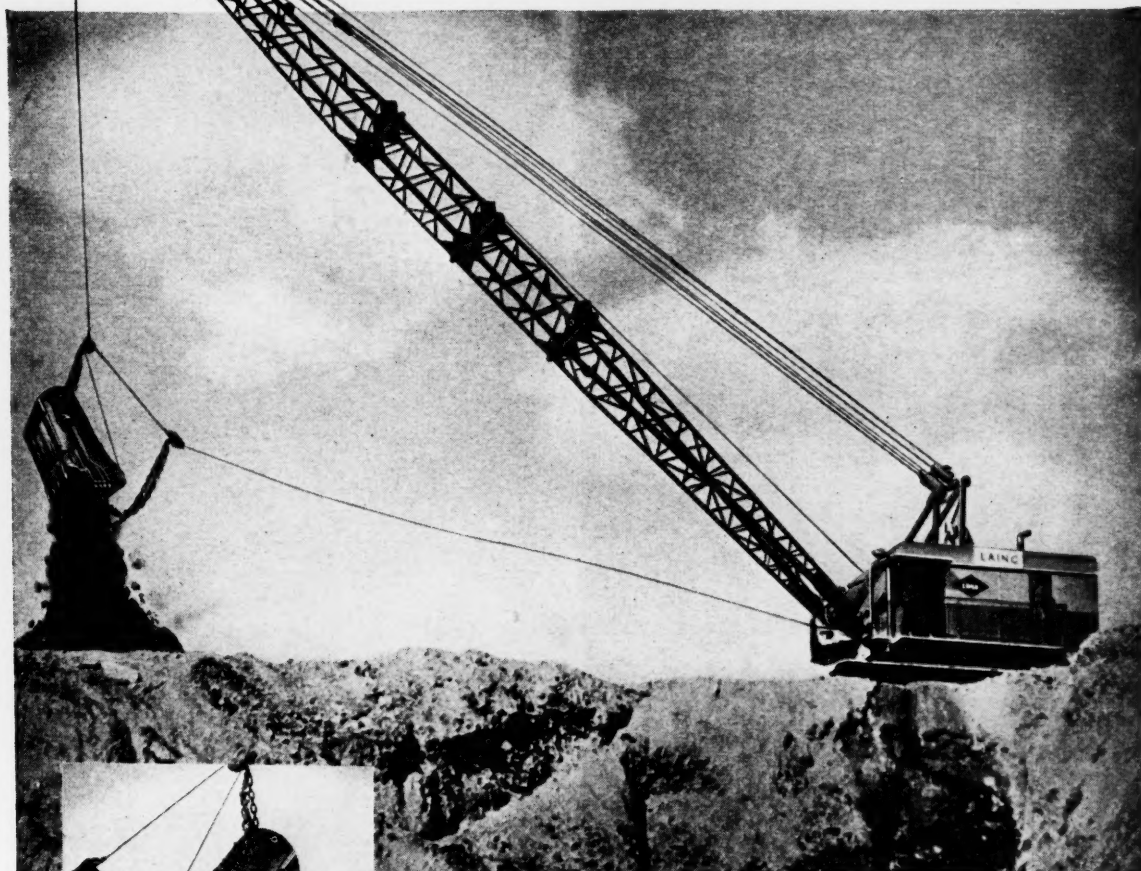
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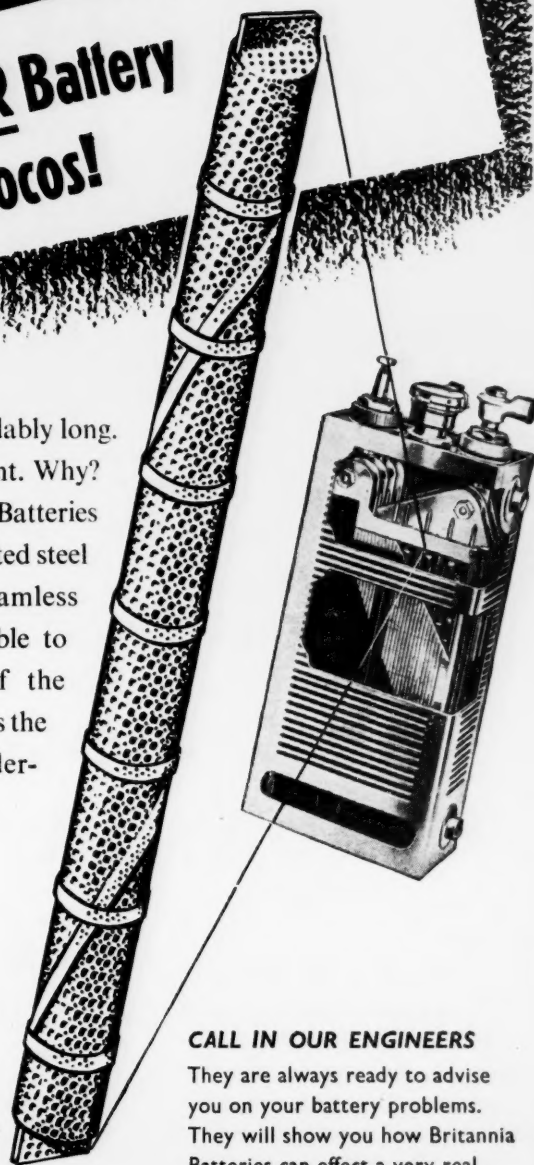
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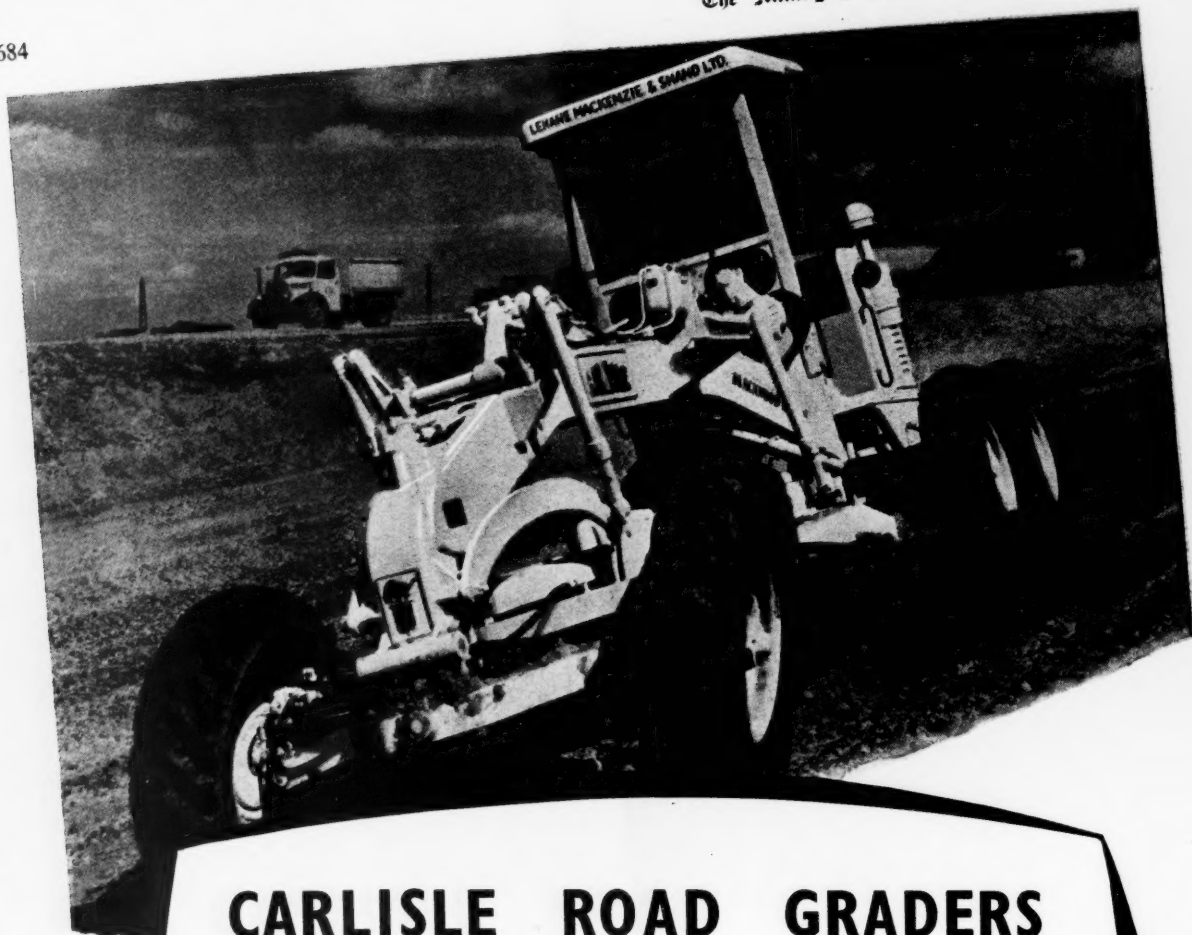
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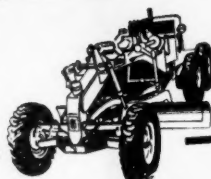
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## CONTENTS

Notes and Comments	685	Company News and Views	698
From Our Own Correspondent	686	Company Meetings and Announcements	701
Spain; South Africa; Belgian Congo		Burma Mines Limited; The Gold Fields Rhodesian	
Causes and Prevention of Belt Failure	688	Development Company Limited; Compagnie Géologique et Minière des Ingénieurs et Industriels	
Centralized Load Control in the O.F.S.	691	Belges; Rand Mines Ltd.; Transvaal Consolidated	
Experiments in Roof and Floor Bolting in Scotland	692	Land and Exploration Company Limited; Anglo	
Technical Briefs	694	American Corporation of South Africa Limited	
Metals, Minerals and Alloys	695	Company Shorts	703
The Mining Markets	697		

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## NOTES AND COMMENTS

### The Geneva Tin Conference Ends

The Tin Conference at Geneva ended on Tuesday—earlier than was originally forecast. This would seem to imply either more ready agreement than anticipated or that it is recognized that the conference has carried matters as far as practicable at present. As usually happens the strict secrecy enjoined for the proceedings has been either relaxed or ignored and a number of disclosures, possibly due to "leakages," are reported.

After Mr. Nichol's cold douche had depressed prices in the middle of last week, the decline in the market has been fully recovered and an "all smiles" atmosphere is reported to have been displayed by the delegates. The spread between maximum and minimum prices, originally reported to have been envisaged at £120 a ton, has been enlarged to a range of £240 within which the market would be free to adjust itself, without buying or selling interference by stockpile control—the respective figures being £640 and £880. The delegations will take copies of the draft report for study by their respective Governments and a time limit of up to six months will be allowed for these Governments to give their views on the draft agreement concluded, though there is nothing in the draft to commit any Government to acceptance.

Until such time as the full text of the agreement and any appreciations on its import are published the optimism among the delegates and the corresponding resilience of tin prices cannot be entirely understood. A possible explanation of their satisfaction would seem to lie in the belief that a gradual change is taking place in the United States attitude from that exhibited by Mr. Johnson's Senatorial Subcommittee's report on the "gouging" of the U.S. consumer and a hypothetical tin cartel which so effectively slashed prices. This change is said to have stemmed from a planning group in the Administration which aims at stabilizing various key commodities more particularly copper, tin, vanadium and industrial diamonds by buying for the U.S. stockpiles when world prices sag and selling from these hoards when prices are high, a vast change from the original conception of stockpiles.

The extent to which price propping has been adopted in agricultural products in the United States and which it is sought to extend to domestically mined minerals and metals

and would seem logically to lead to a wider application designed to stabilize world markets and import a measure of security to primary producing countries whose economy might be in a precarious position without some kind of floor being provided. Dr. Eisenhower after his visit to South America is understood to have recommended a basic material stockpiling programme to help bolster the economy of Latin-American states where the prospect of U.S. purchase of the Chilean copper accumulation is outstanding.

Should such a policy be eventually adopted by the U.S. Administration it is felt that this could not reasonably be confined to the western hemisphere; the impact of Communism would seem to be at least as threatening in the Far and Middle East as in South America and the need of buttressing the economies of Malaya, Indonesia and Thailand would thus involve stabilization of tin and rubber prices. We do not know what, if any, countenance to such a policy may have been given at the Geneva Conference from American sources, but any such intimations would go far to explain the optimism which appears to have characterized the later stages of the Conference. Whether the adoption of such a policy by President Eisenhower's Administration would in fact be possible must at present be a matter of speculation, and until the Randall Commission has reported which it is due to do by next March, no decision seems possible. In any case, there is likely to be extensive opposition from many Republicans, particularly the Western mining bloc, and from economists nervous about the increasing strain on the nation's financial position, and the unknown magnitude of the commitments which would be involved cannot be fully estimated in advance.

The fulfilment of any such planners' international projects must ultimately receive the sanction of Congress, and with the Mid-term elections due next year with major issues like the revision or abrogation of the Taft-Hartley Act and the Communist witch hunts, the Administration may be forced to compromise with Congressional resistance and any such grandiose plans as the underwriting of stable markets for primary products everywhere may have to be postponed if not abandoned. Thus the postponement for six months of any definite outcome from the Geneva Committee's proceedings seems inevitable, and is in line with anticipations expressed before it met.

### The Outlook For Géomines

The report of the directors of Géomines—the big Congo tin producer—a translation of which appears on page 702, records an increase in tin production after the four preceding years of steady decline. The comparatively modest increase reported fully confirms the assurances given by the company that its vast new hard rock deposits of cassiterite, the discovery of which was announced some two years ago, will not be worked in such a way as to upset the tin market.

Even so, a number of factors have no doubt contributed to the smallness of the increase so far recorded. In the first place the company is still in the process of installing a considerable amount of new plant and equipment, both in connection with the working of the new deposits and with the extension to its central hydro-electric plant. This latter is expected to be in full operation by 1956, at which point power would be available for a cassiterite output of 7,000-8,000 tonnes.

In his address to shareholders, Monsieur Dewandre, the deputy chairman of the company, had some interesting observations to make on the general tin position. He pointed out that while the costs of his company had increased four-fold since 1939, the current market price of tin was only up by 185 per cent compared with 403 per cent for copper, 380 for lead, and 314 for zinc. If some relief was not forthcoming as a result of the Geneva Conference he felt that, with costs where they were to-day, it would be necessary to consider a reduced scale of operation, if not a complete shut-down. In saying this he made it clear that he was fully alive to the unfortunate political and economic repercussions on the Congo of such action, and he appealed to his Government to consider tax reliefs which might help to avert such an outcome.

Incidentally, it is clear that Géomines has not yet felt the full effect of the fall in tin price, as a substantial portion of its output has been sold to the States under the current R.F.C. contract with the Congo on the old 118 per cent basis. Moreover, it is interesting to learn that the grade of ore in the Manono deposits is so consistent that the company has virtually no scope for raising the grade of ore worked. There is, however, obviously scope for increasing the output of tantalum-niobium concentrates and every effort is being made to do so. Moreover, the company appears to have developed a process for producing lithium carbonate which will justify the working of their lithium deposits.

One way and another it is a little difficult to feel that the ultimate disaster of closing down, hinted at by Monsieur Dewandre, is likely to eventuate, and it is clear that in the long run Géomines has an output potential second to none and of the greatest strategic importance in the event of any future military or political threat to other tin producers.

### Fresh Oil Resources

Sources of world supplies of oil are constantly being extended as a result of the vast capital devoted to exploration and development. While the largest field of expansion has taken place in areas already recognized as petroliferous, we have to note this week the reports of discoveries in Australia and in the Commonwealth territory of New Guinea. Search for oil pools in Australia has been more or less active for many years and the announcement that oil has been struck by a subsidiary of the Standard Oil of California has touched off a violent boom on the stock exchanges of the Dominion, due, in part no doubt, to the national satisfaction that the Australian Continent, so rich in other minerals, possesses potentialities as an oil producer.

For many years great hopes centred on the Roma area in Queensland, from which natural gas was derived, but extensive prospecting has failed to result in discoveries of oil. After the first World War, the late Mr. W. M. Hughes,

at that time Premier of Australia, took great interest in oil prospecting and Captain Eugene de Hautpik was engaged to make a general report on the most promising areas for investigation. His attention was attracted to the north-west of Western Australia (in territory subsequently taken up by the Freeney Syndicate) and more particularly to Lakes Entrance in Gippsland and the Coorong in the estuaries area at the debouchement of the River Murray. Of these, Lakes Entrance appears to have received most attention on a wildcat basis, and though some petroleum was found, the boreholes were eventually abandoned.

The discovery which has created so much excitement in Australia this week is in the neighbourhood of Learmonth, near Exmouth Gulf, on the north-western coast of Western Australia not far from Onslow. Here oil was struck at 3,600 ft., and a bore under pump is said to have yielded 20 barrels an hour through a  $\frac{1}{4}$  in. pipe during a 25 hour test. Encouraged by these results, further drills will be put down to greater depths, but several months will be necessary to assess the importance of what is now known as the Rough-range field.

Almost simultaneously prospectors are said to have struck oil in the Oriomo district of Western New Guinea, where natural gas has already been found, and Dr. Raggatt, Secretary of the Australian Department of Natural Development, is reported as rating the eventual prospects here as being better than in the Roughrange field.

Another and potentially much more important development for future oil production is the renewed interest being exhibited in the utilization of the oil shales of Colorado. In this area the problem is technical rather than physical since one portion of the deposit, it is estimated, would yield 100 billion barrels of oil. Though commercial interest in the solution of the refinery problems which these oil shales present has died away, the Bureau of Mines has continued its studies to evolve an economic process, and the Union Oil Company of California has now proposed a scheme under which private industry and the United States Government would co-operate in building a full-scale plant to process oil from the shales.

## Spain

(From Our Own Correspondent)

Madrid, December 1.

With reference to reports which have appeared, principally in American newspapers regarding developments at the Almadén mines and the policy of the administration; as you are aware this organization is generally reticent. However, recently your correspondent was able to glean some particulars. The present low prices are of course affecting the quicksilver trade but not to the extent of stopping sales abroad and up to the end of the summer, foreign shipments were maintained. Later information may reach your correspondent before long. Almadén quicksilver is shipped to many countries, Sweden, Norway, Germany, Switzerland, Belgium, Holland, Japan, France, the Argentine, etc., besides the major markets in the U.S.A. and Great Britain. Of course no direct shipments would be made to the U.S.S.R., or its satellites, but it is impossible to say what the final destination of some Spanish quicksilver might be. At the mines the installation of the new rotary distillation furnaces is nearly completed as well as of the ore sorting equipment. As regards relations with the Italian Consorzio, nothing of this kind is projected by the Administration.

The zinc industry is of course feeling the effects of the low prices. The chief producer, the Cie Royal Asturienne des Mines, is taking steps to obtain better exchange on the export of metal and ores.

Developments of the magnesite mine near the Escorial are progressing favourably.



## South Africa

(From Our Own Correspondent)

Johannesburg, December 7.

At the opening of the Western Reefs plant, the new Minister of Mines, Dr. J. R. van Rhyn, said in his speech that uranium production will be on a far greater scale than was envisaged when the Prime Minister opened the West Rand Consolidated plant some 14 months ago. Capital expenditure is now likely to reach the £50,000,000 mark while gross revenue is expected to be in excess of £30,000,000 a year. The total number of mines now scheduled to produce uranium is 23, and investigations into the potentialities of others are proceeding.

The Western Reefs plant is the largest yet constructed in the Union and is of about twice the capacity of the Daggafontein plant which was opened in May. The sulphuric acid plant will supply not only the needs of this plant, but will contribute acid to the "U" plants of other Far West Rand mines. An interesting point about Western Reefs is that much of the early experimental work on uranium recovery was conducted on this property. The first samples were taken for testing in 1945, and in October, 1947, a small flotation unit was started up. This was operated until 1949, when work along these lines was stopped.

Officials from Western Reefs were then seconded to the Government Metallurgical Laboratory in Johannesburg to help in the operation of a leach plant there. This plant was transferred to Blyvooruitzicht and the work continued. Early in 1950 a second leach plant was erected at Western Reefs which ran until August, 1953, when trial runs on the main plant began. The original leach plant stands a stone's throw from its major counterpart now operating.

### THE EXTRACTION PROCESS

The actual uranium extraction process at Western Reefs is identical with that used in other mines. Briefly, residual slimes from gold recovery are treated with a solution of sulphuric acid and manganese dioxide which dissolves the uranium. This is precipitated and recovered as a hydrated uranium oxide. The iron pyrite in the slimes from this process is recovered by flotation. The slurry is injected on fluo-solid furnaces and roasted at a temperature of approximately 1,600 deg. F. in the presence of air and water. The sulphur dioxide formed is converted into sulphuric acid. An interesting point is that the calcined residues are further treated and a small, but economic, quantity of gold recovered. It can be said, therefore, that gold is recovered as a by-product of a by-product of gold mining.

The other developments in the Klerksdorp area are the decision to spend £2,000,000 on making Dominion Reefs a uranium producer, and to investigate the potentialities of the neighbouring property of Klerksdorp Cons. These two events are certainly most interesting in that neither of these mines is economic as a gold producer and the milling capacities are exceedingly small, approximately 20,000 tons a month. Furthermore, they are exploiting the lowest reefs of the Witwatersrand series.

Uranium extraction in the Klerksdorp area in descending order of formations is therefore: Western Reefs, Kimberley-Elsburg series; Stilfontein, Vaal reef; Ellaton G.M., Vaal reef; New Klerksdorp, Commonage reef; Babroscos and Afrikaner mines, Government Reef series.

It seems, therefore, that every reef in the Upper and Lower Witwatersrand series in the Klerksdorp area is an economic uranium horizon. This rather fits in with the suggestion put forward some time ago as a result of the intensive radio-logging of the reefs of the Free State and Klerksdorp that the origins of uranium content of the gold-bearing reefs lay somewhere north-west of the Klerksdorp

district. With detailed information still lacking, any forecast of the future is a risky business, but it may be fair to suggest that this area, one of the oldest mining districts in the country, may prove the richest source of uranium. There is no reason why the three large mines at present being opened up, Buffelsfontein, Hartebeestfontein and Vaal Reefs, together with the possibility of at least one further property coming into being eventually on the Klerksdorp Townlands, should not become uranium producers in due course.

November saw the official opening of Doornfontein G.M., the fifth producer of the West Wits line. The occasion was unique in that it coincided with the annual general meeting of shareholders.

### IMPORTANCE OF THE LINE

The magnitude of the West Wits line's production is reflected in that the four other producers are producing one-eighth of South Africa's gold and one-quarter of total working profits. It is now 21 years since the West Wits company was formed. This whole sweep of mines is a living memorial to the faith of the late Mr. Carleton Jones, of New Cons. Goldfields, in this area. Even after drilling had been in progress few people believed in the richness of the line and many felt that the water in the dolomites would prevent major operations ever coming into being.

One of the most significant points that emerged is that the actual values in reef development far exceeded the original borehole results owing to the losses due to grinding of cores. This is now proving the case in the Free State. Composite figures for all developing mines there since the start of operations on reef up until September 30 disclose that of the 200,000 ft. sampled, 120,000 ft. (equal to 60 per cent) have proved payable, with an average value of 17.3 dw. over 24.2 in., or 419 in.-dw.

Compared with the average of all boreholes put down over the field this result is better in terms both of payability and values. The December quarterly reports are likely to prove exceedingly interesting, particularly those of Western Holdings, where the drive through to F.S. Geduld should be well towards the famous Geduld borehole area, and Harmony, where development on reef is reported to be on an increasing scale.

## Belgian Congo Mineral Output

The following are the mineral output figures for the Belgian Congo and Ruanda-Urundi for the first six months of 1953 compared with the corresponding period of 1952.

Belgian Congo		1952	1953
Bismuth .....	lb.	840	nil
Cadmium .....	lb.	20,800	35,000
Coal .....	tons	116,360	155,445
Copper .....	tons	101,294	102,373
Diamonds (gem) .....	carats	283,724	287,856
Diamonds (industrial) .....	carats	5,617,765	5,805,534
Gold .....	f.oz.	200,500	192,800
Manganese .....	tons	23,074	48,357
Monazite .....	tons	6	4.5
Silver .....	oz.	2,727,500	2,820,000
Tantalum-Columbite .....	tons	91	126
Tin .....	tons	5,775	6,489
Tungsten .....	tons	109	128
Zinc .....	tons	52,418	59,624
Ruanda-Urundi			
Bastnaesite .....	tons	71	180
Gold .....	f.oz.	2,195	1,955
Tantalum-Columbite .....	tons	18	34
Tin .....	tons	946	1,009
Tungsten .....	tons	109	139

## BELT CONVEYORS—II

# Causes and Prevention of Belt Failure

By A. GRIERSON, B.Sc., A.M.I.Min.E.

The choice, installation and service treatment of carrying belts in conveyor systems play a prominent part in determining the life of a conveyor belt and in this article, the second of a series of seven, the causes of belt failure are indicated together with the preventive measures which may be adopted to minimize their effect. The detrimental force of abrasion to belt longevity promotes interesting practices in belt cleaning, while it is emphasized that firmness of joints is a major consideration.

The life of a carrying belt in service depends essentially on the correct choice of belting and the degree of care with which the conveyor is loaded and maintained. As belting is the most expensive part of a conveyor system it is essential that the right type be chosen for any particular installation. Before deciding on a particular type of belt certain primary factors must be considered. These are :

- (a) The nature of the material to be carried, its density and size range, and its condition, e.g. hot or cold, wet or dry ;
- (b) quantity to be carried per time interval ;
- (c) operating conditions, e.g. length of carry and lift ;
- (d) general arrangement of pulleys, etc. ;
- (e) situation of belt, e.g. whether surface or underground ;
- (f) working conditions of a specially onerous character, e.g. acid fumes, presence of oil, excessive water, etc. ; and
- (g) economic considerations.

Whilst the final choice of belting is best left to the manufacturer, sufficient indication has been given of the various types of belting available to afford a working guide to prospective buyers.

The maintenance of belting subsequent to installation is a matter often receiving insufficient attention. Whilst correctly chosen and well-maintained belts have a life of 4-6 years, the author found from a series of investigations into large underground coal conveying installations that the belting had a life of only 2-3 years. Principal causes of belt failure are abrasion of top cover, abrasion of bottom cover, abrasion of sides of belts, belt fasteners, vulcanizing and flexing. These are indicated below, together with the possible preventative measures.

## ABRASION OF TOP COVER

Abrasion to the top cover of a belt is caused primarily by the impact of material being loaded onto it, and also by abrasive action of adhering material carried back along the return run. Impact damage can be greatly reduced by ensuring that the load is delivered onto the belt in the direction of belt travel and as nearly as possible at the same speed. The distance through which the material falls onto the belt should be as small as possible and it is good practice to install shock absorbing idlers at loading points. On to these impact idlers a two-inch rubber cover is bonded, consisting of different grades of rubber ; a hard grade giving permanent bonding to the steel shell of the idler graduating to a soft grade on the outside giving a full cushioning effect to the belt.

Whilst engineers are fully alive to the harmful effects of impact abrasion it is unfortunately all too often that the danger of a dirty belt is not fully recognized. Where a conveyor is carrying material such as ore or coal which may have an appreciable percentage of fines in its composition, it is essential that the belt surface be adequately cleaned. This is of particular importance with tandem drum drives or where snub pulleys are used, as under these conditions the carrying surface of the belt makes contact with a drum

and any dirt particles adhering to the belt are either encrusted on to the drum or embedded into the belting. Either of these two occurrences is detrimental to the life of the belt, and even with simple single drum drives any dirt adhering to the carrying surface is carried along over return idlers on which it builds up and so causes the belt to run off centre. Where the material being carried is dry, the belt can be easily cleaned by means of a scraper set immediately behind the primary driving drum. These rigid cleaners should not be used on a belt having metal fasteners unless these are patched flush with the belt. Several instances are on record of scrapers making contact with projecting fasteners, so causing these to be ripped from the belt and giving rise to severe tears. Scrapers may be of rubber or thin stainless steel strips ; the former are safer than the stainless steel but are less effective. Stationary brushes are sometimes used but these are only effective for a limited period as the bristles rapidly wear down.

## REMOVAL OF DAMP MATERIAL

Where the material is damp and sticky removal is more difficult. The usual device used in such cases is the rotary brush. This is a high speed brush with rattin or nylon bristles projecting radially from a wood cylinder. The brushes are driven either by gearing from the conveyor drive or by an independent high speed motor. They are caused to rotate in the opposite direction to that of the belt and have a peripheral speed usually twice as great as the latter. This high velocity is necessary to throw the material out of the bristles. The use of brushes less than 8-10 inches in diameter is not recommended owing to the small circumferential surface available for insertion of bristles. These bristles require to be hard-wearing and yet must not prove injurious to the belting.

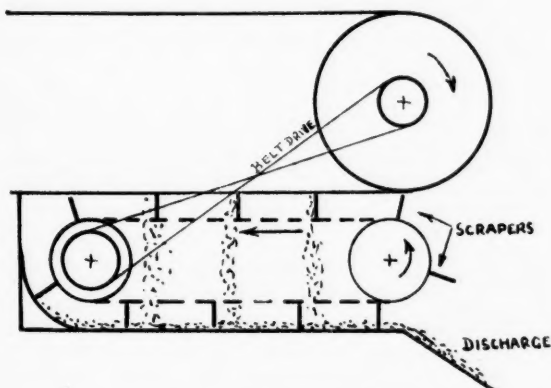
One reason for the short life of the rotary brush is the common practice of applying too much pressure to the brush. The drag or deflection of the bristles in contact with the belt should only be of the order of  $\frac{1}{4}$ ". A number of tests carried out by the author on a 30" belt conveyor carrying 300 tons per hour of friable coal showed that an average of 3 cwt. of dirt was removed by means of a brush per shift of 8 hours. In a coal mine, quite apart from the beneficial results of cleaners upon belt life and drum wear, the installation of brushes is advisable so that these large quantities of dust are not deposited along the return run of the conveyor to create a potential coal dust explosive mixture.

Particularly difficult conditions such as the conveying of wet clay, mud, or similar substances, present a weighty problem, as the adhering solids are carried back along the return run of the conveyor and build up on the return idlers. In such cases the use of high velocity water jets followed by a squeegee wiper to remove excess moisture often proves effective when other methods fail. Another device is to space beater pulleys at intervals along the return run. These resemble a squirrel cage and function well with damp sand.

Probably the most effective belt cleaning device consists of a short scraper conveyor with rubber faced belt scrapers

attached at intervals. Any number of scrapers may be fitted, the scraper belt being driven via a chain drive from the main conveyor drum.

By this means the wear on the carrying surface of a conveyor can be reduced. It is worthy of note that the installation of a rotary belt cleaner on a large surface conveyor carrying gravel resulted in a twelve month increase in belt life.



Belt cleaner for difficult conditions

A comparatively recent innovation is the Turnover Conveyor Belt System instituted by an American firm of manufacturers. Here the belt is turned through 180° at each end of the conveyor by using two additional snub pulleys. This permits the clean bottom surface of the belt to be presented to the idlers on both the carrying and return run and thus dispenses with the need for belt cleaners. Each 180° turn is in the same direction so preventing undue stresses in the belt; the distance required to enable turning is approximately 1 foot per inch of belt width.

#### ABRASION OF BOTTOM COVER AND SIDES

If the idlers are not kept thoroughly lubricated they will not turn freely and so will cause undue abrasion on the bottom rubber cover and additional strain in the carcass. Abrasion on the bottom cover of the belt is also caused by pieces of material falling from the upper strand on to the return strand and being carried on the end pulley and there squeezed between drum and belt. The high pressures between the belt and the drum accentuate the abrasive action and a puncture in the rubber cover may result, while moisture penetrating the opening will rot the carcass. It is good practice therefore to have the bottom belt fully covered and to have a plough on the lower strand at the tail end of the conveyor.

Skirt boards, guide plates and chutes, must be so designed and supported that under no circumstances will they touch the belts. Incorrect positioning of chutes at intermediate loading points along the belt will result in the material not being fed centrally on to the conveyor, and the belt will tend to run to one side.

The same effect is brought about by incorrect setting of idlers and misalignment of the belt, which necessitates the use of vertical guide pulleys. These pulleys will eventually wear away the edge of the belt, and their use is deprecated by the majority of mining engineers.

Figures from many breaking load tests averaged out on the initial belt strengths show that the best metal fastening has a strength far below the ultimate breaking strength of the belt. If the conveyor is working under wet conditions this tear-out strength is greatly reduced, as water penetrating

the small punctures made by the fasteners rapidly rots the carcass of the belt. Torn out fasteners constitute a principal source of trouble in belt conveying practice, and if not discovered in time, frequently result in serious tears in the belt. The appended table shows the results obtained from a series of tests carried out on 20 in. conveyor belting:

Type of Joint	Breaking Strain (tons)	Strength of Belt %
Laced	7.35	45.3
Plate hinge	5.56	34.3
Butt joint	4.75	29.3
Spliced	6.35	39.2
Hook joint	7.27	44.1

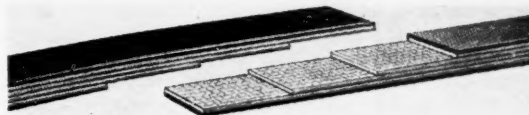
While not sacrificing tensile strength, belt manufacturers endeavour to have the maximum cover content in the belting and so increase the resistance of the belt to abrasion and deleterious agencies such as moisture.

#### THE NEED FOR VULCANIZING

In order to eliminate the danger of broken joints, belt vulcanizers should be utilized when lengths of belting are connected, the join being effected either on the surface or *in situ*.

This need has been promoted by the introduction of large, high capacity trunk conveyors, transmitting possibly 200 h.p., which demanded a more efficient form of conveyor belt joint. It is apparent from the previous table that belt strength is reduced at least 50 per cent by the introduction of metal fasteners.

The conveyor belt is prepared for joining by cutting away the plies at the ends to be connected (on opposite sides) in the form of steps, in such a way that when these are brought together the stepped portion of one end fits snugly into the stepped portion of the other. The number of steps is determined by the number of plies in the belt. This stepping provides a good overlap, which, in the case of a 7 ply 42 in. wide belt, is in the region of 5 ft. This ensures the distribution of tension over an adequate area. The stepped ends are cleaned with a wire brush or chemical cleaner and coated with rubber solution. When this has dried the vulcanizing compound is applied and the steps bedded together and placed in the vulcanizer. It is essential that all moisture be removed from the belt before placing in vulcanizer as otherwise internal steam blisters will be formed.

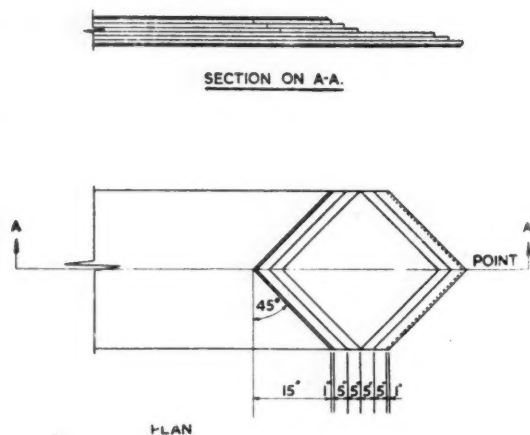


Belt ends stepped for bonding. The simple stepped splice

The heating equipment is arranged to give uniform distribution of heat over the entire working surface of the pressure plates, between which the ends of the belting to be joined are placed. A range of from 150°F. to 450°F. is usually available; thermostatic control maintaining the correct working temperature for any particular joint. Electricity or steam may be used to provide the necessary heat. Pressure on the heated plates may be applied by means of tommy bars and screws and the belt is left in this position for the period of time specified in the vulcanizing time table supplied with each instrument. In the case of the 7 ply belt mentioned previously this period was 30 minutes.

On removal from the vulcanizer, the joint is allowed to stand for a number of hours. When ready for use the





The diamond splice

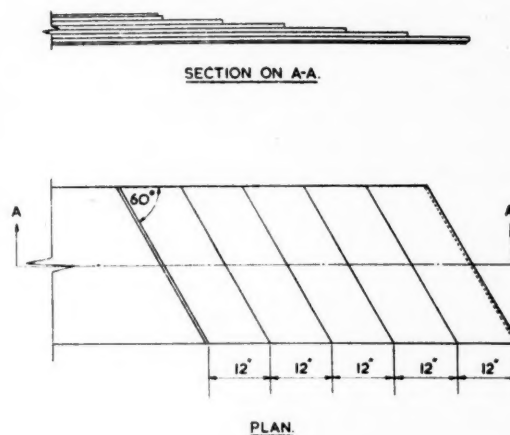
belt is in effect endless, the joint itself being integral with and practically indistinguishable from the run of the belt. The joint is also flexible and tests have shown that a well vulcanized conveyor belt joint can successfully withstand stresses up to 90 per cent of the ultimate tensile strength of the belting.

Apart from the simple straight splice, other methods of splicing have been devised such as the diagonal splice and the diamond splice. In the former the plies are cut away in steps just as with the straight splice, except that the cuts make an angle of about 60° with the length of the belt. With the diamond splice, cuts are made from each side of the belt at 45° to form a pattern. The diamond splice is claimed to give the strongest joint, and is almost universally used when joining belts greater than 24 in. in width. Since the joints are of considerable overall length, vulcanizing machines are seldom long enough to cure a complete joint in one operation. Consequently, the machine is applied from one end of the joint, and, as each curing is completed, it is moved along until the whole length of the joint has been covered. Polyvinylchloride belts are also capable of being vulcanized, the procedure being much the same as described, with the exception that special P.V.C. sheeting cover is applied to the stepped ends and the whole area of the joint is placed between aluminium plates before being introduced into the vulcanizer press. The press is closed with a hydraulic pressure of not less than 50 lb. per sq. in. and heat is applied at a temperature of about 340°F. for 15 minutes. The press is then cooled, preferably by water circulation, until the temperature of the belt drops to 176°F. when the belt can be removed from the press and the aluminium plates taken off.

### PRICE FACTORS

The initial cost of a vulcanized joint is, of course, much greater than for a metal fastener connection. This is due to the much greater amount of work involved, the need for fully experienced workmen, the more elaborate equipment necessary and the fact that several feet of belting are cut away. Costs vary widely but would appear to be in the region of £8-£12 per joint in Great Britain. However, more than offsetting this seemingly high cost are the attendant benefits consequent to vulcanized joints on large conveyor runs.

In a report issued by a Sub-Committee of the United States Mining Congress in 1947 it was claimed that vulcanized joints were largely responsible for improving the working



The diagonal splice

life of conveyor belts from 4 to 10 years. The economic benefits of such an increase in the expectation of life of conveyor belting will, of course, render insignificant any increased cost of joining sections of belt.

### INTERMITTENT FLEXING

When the conveyor is in operation the belt is intermittently flexed, laterally and transversely. Lateral flexing, the continued bending of the belt at the junction of the horizontal and inclined rolls of the idlers is increased with longer belts, whereas transverse or drum flexing is correspondingly reduced. Up to approximately 400 ft. conveyor length the lateral flexing or hinge effect of troughing does not appear to have much effect on the life of the belt, but on longer conveyor runs lateral flexing assumes greater importance.

After continued experiments a formula has been derived showing the relationship existing between length of belt service in flexing, drum diameter, tension in belt, thickness of belt, and speed of belt, this relationship being expressed :

$$S \propto \frac{D^{5.35} L}{V^{0.5} N^{6.27} T^{4.12}}$$

Where S = length of belt service in flexing,  
D = diameter of driving drum,  
L = length of belt,  
V = speed of belt,  
N = thickness of belt,  
T = maximum tension in belt.

This formula does not take into consideration the more serious effects of external destructive agencies such as abrasion, etc. and only considers resistance to internal destruction by flexing. Consequently, it cannot be used as a means of expressing the life of a conveyor belt in service. However, the formula serves to illustrate the importance of adhering to the recommendations previously given regarding drum diameter and belt tension. It shows, for example, that if a conveyor driving drum of 3 ft. diameter be replaced by a drum of 2 ft. diameter the belt life, purely by consideration of flexing, will be reduced to approximately 1/9th of its original value.

[In the introductory article to this series, published last week, the sentence appeared, "All P.V.C. belts have the disadvantage of being a possible source of danger owing to the inflammable nature of their constituents." This should, of course, have read, "All previous belts" etc., namely, balata, stitched canvas, and the various rubber constructions referred to in the foregoing paragraphs.]



## Centralized Load Control in the O.F.S.

It will be recalled that in *The Mining Journal* of July 31, 1953, an article on the supply of electric power in the South African gold mining industry pointed out that the effects of the existing power shortage had been considered when the initial milling capacities of the Orange Free State mines were planned. The difficulties presented by the sudden impact of large-scale production on limited power supply was largely overcome by installing the full milling capacity so that a reduced initial output might be maintained by milling at off-peak periods only. The following article, condensed from *Optima*, Vol. 3 No. 4, a quarterly review published by the Anglo American Corporation of South Africa, describes the system of controlling the power consumption of individual O.F.S. mines within the Group, thus allowing the Group's developing gold mines to make the fullest use of available electric power.

It is well known that, owing to the phenomenal post-war growth of mining and industrial activity in South Africa, the demand for electric power has outstripped the Electricity Supply Commission's vast programme to increase the supply of power. The post-war difficulties that faced the Electricity Supply Commission have already been described.

As a result of this shortage of power, it has been necessary to restrict the supply allocated to the mines in recent years. During the last three years, the available supply, although increasing as new generators have been brought into use, has fallen below the full requirements of the expanding mining industry by between 90,000 and 160,000 kW. Although more power is expected to be available next winter (mid-year, 1954) the expansion of work in the developing mines, the transition of other mines from the developing to the producing stage, and the increasing rate of output of the new producing mines will raise the demand for power by at least an equivalent amount; thus, the gap between supply and demand will probably be no smaller. But it is expected that the shortage will be relieved entirely by the end of 1957.

### THE ALLOCATION SCHEME

This substantial shortage of power could well have seriously dislocated mining operations by curtailing the milling operations of established producers and restricting the free rate of development of the new mines in the Klerksdorp and Orange Free State areas; but such dislocation was prevented by the close co-operation between the mines by the Technical Power Committee of the Transvaal Chamber of Mines and the Electricity Supply Commission—and, in particular, the Commission's Rand Undertaking.

In June, 1951, the Technical Power Committee of the Chamber, in consultation with officials of the Rand Undertaking, introduced throughout the gold mining industry a highly successful system of voluntary control of internal power consumption. The scheme works on the following lines. The power that can be made available to the mining industry each month is allocated in bulk by the Electricity Supply Commission to the Chamber of Mines, which, in turn, through its Technical Power Committee, reallocates a bulk proportion of the power to each of the mining groups represented and to mines not under group control.

The system is based on an agreement that each group of mines to which a bulk allocation of power is made will not exceed its allocation during any one hour during specified peak periods—chiefly between 8 a.m. and 3 p.m. At other than peak hours there is no restriction upon consumption, except for financial reasons. But, within the groups, the power allocation may be divided between the constituent mines in the most convenient manner. This introduces a very valuable degree of flexibility. For example, a producing mine that has "earned" a certain proportion of the total allocation on the basis of its consumption during the previous three months can so arrange to move some of its load demand outside the peak hours. It can do this because it is able to store ore mined during the peak hours and mill it during the night and on Sundays; furthermore, several producers in one group can arrange to stagger the times at

which they hoist, pump, crush ore, and, in certain circumstances, mill ore.

A developing mine, however, does not enjoy this degree of flexibility. Not only are there limited facilities for underground storage of ore, waste rock or water, but the shaft-sinking and development operations are essentially continuous in nature.

The power that the producing mines are able to forgo during peak hours may be allocated to the developing mines that would otherwise be hard pressed to keep within their allocation during peak periods. There is, however, a limit to the amount of power that the producers can forgo without curtailing their output; and when it became evident that the power demands of the developing mines in the Anglo American Corporation Group were growing to a level that might go beyond the safe limit of assistance from the producers, it seemed that it would be necessary to buy expensive, temporary diesel generating plant to supplement the restricted supply from the Electricity Supply Commission.

The alternative was to find some way of making the greatest possible use of the power that was available for the developing mines. The latter alternative was chosen, and the engineers of Anglo American Corporation of South Africa Limited designed and installed a system known as centralized load control, or load despatching, to serve the Corporation's new mines in the Welkom area.

In order to keep their power consumption safely within the given allocations, the mines in general have been consuming less than their full quota; and, without suitable metering and continuous monitoring facilities at each mine, it has not been considered practicable to approach closer to the permitted maximum.

### THE CONTROL SYSTEM

To provide these necessary facilities, a load control centre was established in the Welkom No. 1 shaft offices; its installation took only 4½ months, and the cost was a small fraction of buying auxiliary generating plant.

The control panel contains a meter for each of the five mines at present included in the system. The meters are connected by cables to the appropriate mine sub-stations. By means of impulses transmitted over the cables, the meters record the progressive total of power consumed by each mine during each hour. A sixth meter records the progressive hourly total consumption of all five mines.

If the meters show that one mine is consuming power at a rate that threatens to exceed the maximum hourly allocation, the operator, who is in telephonic communication with each of the mines, can give the necessary warning to the mine. On the other hand—and this is one of the most valuable features of the system—if he sees that one of the mines is consuming less than its full allocation he can notify another mine, which may need extra power, that it can increase its load.

The centralized load control system will continue to serve a valuable purpose even after the Electricity Supply Commission has attained the position of meeting the full demand for power.

# Experiments in Roof and Floor Bolting in Scotland

Growing interest is being accorded the practice of bolting in the United Kingdom mining industry. The following article is the condensation of a paper entitled "Some Experiments on Roof and Floor Bolting," presented at the annual general meeting of The Mining Institute of Scotland on November 11, 1953, by Mr. J. R. Cowan, B.Sc., Manager of Cardowan Colliery, and Mr. C. Sharpe, H.M. District Inspector of Mines, Ministry of Fuel and Power, who record a series of bolting experiments at Auchengeich and Cardowan collieries in the Kilsyth sub-area of the Central West Area of the Scottish Division, N.C.B. The paper deals with the process of bolt application and the results obtained, as well as giving information on the determination of specific installations most suitable for the task.

The locus of the experiment at Auchengeich was the Main Road of the No. 2 Section of the normally 2 ft. thick Meiklehill Wee Coal Seam at 1,050 ft. This section, in which development had recently started, was the continuation of a 1 in. 6 dip mine. The district comprised a single-unit conveyor face line, the coal being undercut to a depth of 4 ft. and hand loaded on to a belt conveyor. Due to the restricted height of the seam it was practice to brush the roadway direct to the coal head and to lift 1½ ft. of the pavement to a point about 3 ft. back from the coal face. The roadway itself was 12 ft. wide and normally supported by steel arches. A pack, 25 ft. in length was built on the left-hand side, the right-hand side being of solid coal and stone. The reason for the test was that, although the strata seemed fairly strong, difficulties had always occurred in this seam with regard to roadway maintenance. It was known from previous experience that entries up to 9 ft. wide generally caused least trouble, and it was hoped that this width might be extended to 12 ft., as this was desirable for the working of double-unit faces, by reinforcing the strata with bolts.

## PRELIMINARY INFORMATION

Before starting to insert the bolts, it was necessary that some information as to the extent and area of strata movement should be obtained in order that bolt lengths and patterns could be decided. To obtain this information convergence recorders were installed, one between the normal roof and pavement of the roadway and the second between the pavement and a point some 6 ft. above the normal height of the roadway. It was decided that roof bolting must be kept close to the coal head, especially since a movement of ½ in. was recorded when the coal-cutting machine crossed the roadhead and the recorder was only 8 ft. away. It was intended to bind the laminated sandstone together thereby forming a compound beam which would be anchored to the massive sandstone above. Accordingly, bolts of the following sizes were decided upon; centre bolts, 4 ft. 9 in., and side bolts, 6 ft. 5 in.

The resolved pattern consisted of five bolts in a row with a 10 ft. corrugated steel strap bolted to the roof. The bolts were inserted as follows; side bolts, inclined 45 deg. over the roadsides; intermediate bolts, inclined 60 deg. inbye and outbye along the line of the roadway, and the centre bolt at vertical. These angles were measured from the plane of the roof.

## INTRODUCTION OF BOLTS

To obtain sufficient strength it was decided to use 1 in. diameter round mild steel bars in the manufacture of the bolts. Bolts and wedges of the sizes stated were manufactured in the colliery workshops. This split rod and wedge type fix was used in preference to the expansion shell since in previous tests great difficulty had been experienced in making the fix at the top of the hole. The straps used were corrugated steel face straps, 10 ft. in length, 5 in. wide and ½ in. thick. Holes were cut into the straps to allow for

the five bolts to be fixed at the following places; one in the centre of the strap, and then at 2 ft. intervals on either side of this which brought the end holes 1 ft. from the end of the strap. Flat washers, 6 in. square, were made to be placed immediately below the strap to give a large bearing surface; angle washers were made at the angles previously mentioned and were manufactured from 2 in. x 2 in. angle iron and bored at the required angle.

It was decided that the roadway should be supported by means of 4 in. x 4 in. H-section steel girders with a wooden prop set under each one, and that the rows of bolts should be positioned between these girders. Fundamentally the tests were to be on roof bolting, but the question of dust suppression was not neglected.

In fixing the bolts, holes were drilled to a depth sufficient to accommodate the bolts, leaving 2 in. protruding for attachment of the strap and nut. The wedge was then loosely fastened in the cut end of the bolt and inserted into the hole as far as possible by hand. Over the screwed end of the bolt was fixed a dolly which allowed the bolt to be driven home by means of the boring machine.

The equipment available for this experiment was an Atlas Diesel stoper machine working on an airleg which extended one metre. An inbye air compressor gave adequate compressed air at 75 lb./sq. in. and this was sufficient for the work in hand. The drill rods consisted of the chisel type, 7/8 in. hexagon rods, tungsten tipped and of varying lengths, fitted for a 4½ in. chuck, and bored holes of 1½ in. diameter.

## OBSERVATIONS OF RESULTS

This experiment started on February 23, 1952, and the face line advanced slightly over 80 ft. as a single-unit conveyor face. At this point the right-hand side was developed and on June 18, 1952, the face line advanced as a double-unit conveyor face. Bolting continued for a distance of 160 ft. and the experiment was brought to a close on August 18, 1952, the face line continuing to advance. From the end of the bolted length the roadway was supported by the 4 in. x 4 in. H-section steel girders set with a wooden prop at each end, but the girders became so distorted that it was necessary to resort to steel arches which also became distorted later. After a lapse of time, a break of 17 ft. appeared inbye the last bolting, continued across the road, and, from inspection, it appeared to penetrate to a great depth. The roof girders of the bolted section of the roadway have not bent and no trouble has been experienced.

## TRIALS AT CARDOWAN COLLIERY

Subsequent to the experience gained in the previous trials it was decided to investigate the possibility of using bolts to prevent pavement lift. A suitable subject appeared to be the gate road of the East Meiklehill Wee Coal double-unit conveyor face at Cardowan Colliery at a depth of 1,500 ft. This face line is 700 ft. in length, being more or less equally divided on either side of the gate road. The

gradient on the face line is 1 in 25 and the roadway rises at 1 in 30. The road is supported by 12 ft. x 8 ft. steel arches set on 9 to 12 in. stilts. The 1½ ft. thick fireclay, which lies immediately below the coal, is lifted the full width of the road and to a point about 3 ft. back from the coal face. Packs about 30 ft. in length are built on each side of the roadway from the roof-brushing which forms good packing material.

Floor movement was of such magnitude that it was normal practice to take a pavement-brushing, 3 ft. in thickness, some 1,000 ft. behind the working face. It was found from physical examination that the floor movement appeared to cease when repeated back-brushings uncovered a massive sandstone. This gave rise to the theory that if a beam of sufficient strength could be formed at the floor of the roadway, pavement movement might be arrested.

### IMPORTANCE OF STRATA REINFORCEMENT

It was decided in the experiment described to reinforce the strata across the whole width of the roadway. This decided the form of pattern, and the bolts were again fixed at a length of 4 ft. 6 in. To eliminate the possibility of a continuous break developing between lines of bolts it was decided to use a staggered design. At the head of each bolt was fixed a 12 in. square, ½ in. thick, steel plate with which the nut made full contact. The holes bored were of 1½ in. diameter and the material from which the bolts were made was ¾ in. round steel. In this case the length of split for the wedge was increased to 6½ in.

All holes were bored vertically by means of an ordinary hand-held compressed-air Jackhammer, and the bolts then were driven over the wedge after a suitable dolly had been placed on the threads by means of a pneumatic pick. This bolting was installed immediately behind the coal face, and throughout the whole of the experiment it became a part of the cycle to install the bolts before the girder-heads and gate-road conveyors were brought forward.

In an endeavour to measure the amount and extent of any floor movement that might take place, a convergence recorder was installed. After a length of 230 ft. had been completed with fairly successful results, the pattern was changed by reducing the number of bolts and increasing their length. They were concentrated at the point where maximum movement appeared to take place. In this instance, a two-three alternate pattern was used in the centre of the roadway with bolts increased in length to 6 ft. At pavement level one steel plate 5 in. wide, ½ in. thick, and long enough to take three bolts at 1 ft. 6 in. intervals was screwed to the pavement, while the second had accommodation for only two bolts. The rows of bolts were reduced to 3 ft. 6 in. apart. A gap of 33 ft. was left between the two patterns.

### TESTS ON BOLTS

The choice of bolt, its length, diameter and type of fix used, is of the utmost importance. During the experiments related in this paper, bolts from ¾ to 2½ in. diameter were tested. In the cases where definite figures are quoted they were obtained by the use of a hydraulic pump, supplied by the S.M.R.E. Other tests were made through the medium of a coal-cutting machine clutch-tester and a 15 ton electrically operated crane. The results obtained are shown of tests using 1½ in. diameter borehole:

Bolt diameter	¾ in.	1 in.	1½ in.	2 in.	2½ in.
Type of fix	¾ in. wedge	1 in. wedge	1½ in. wedge	2 in. wedge	2½ in. expansion shell
Load at first movement (tons)	2.175	3.625	5.8	4.35	2.9
Total load applied (tons)	5.8	6.825	10.15	10.15	3.625
Total movement on total load	collapse	collapse	0.25 in.	0.75 in.	collapse

The following results occurred in tests using a 1½ in. diameter borehole:

Bolt diameter	1½ in.	1½ in.
Type of fix	½ in. wedge	¾ in. wedge
Load at first movement (tons)	12.5	12.5
Total load applied (tons)	15	52
Total movement on total load	0.375 in.	0.5 in.

These results were obtained by amperage taken by electric crane.

It will be readily seen that if the borehole and the bolt were of nearly equal diameters the expansion of the split portion, produced by the wedge, would form an arc of contact of approximately 260 deg. It therefore follows that any reduction in bolt diameter, irrespective of wedge sizes, will reduce this arc and area of contact proportionately, and it would appear from the tests that if the diameter of the bolt is some ¼ in. less than the diameter of the borehole, the possibility of obtaining a fix with sufficient resistance to movement is doubtful. The question of mechanical strength in the bolt does not appear to play a great part in carrying the load, providing it is in the region of ¾ in. diameter, due to the fact that the function of the bolt is to bind the bands of strata together, and not to carry the load.

The type of fix seems to be a matter of choice. It can be safely said that the split rod and wedge is much cheaper and that in these experiments has given satisfaction in its ability to carry the load. The fundamental difference between the two types of fixes appears to be that of contact with the sides of the borehole.

The thickness of the wedge is the factor which makes the fix capable of sustaining the load. The possibility of a change in the strength of the strata where the fix is to be made cannot be overlooked and therefore it is necessary to allow for such a contingency. This possibility is allowed for by wedge extension, a certain length of wedge which protrudes beyond the bolt after the fix has been made, and achieved by making the wedge slightly thicker so that it cannot be driven the full distance. Compared to the cost of a 4 ft. carry of back-brushing in the pavement, floor bolting provides a saving of some 25 per cent in labour and materials. In addition, it was invariably necessary to take a second lift. Similar savings are evident with roof bolting, and in both cases less steel is used.

### RESULTS

Up-to-date reports confirm that the roof bolting at Auchengeich Colliery is still offering adequate resistance to movement, and in the floor bolting at Cardowan Colliery, the No. 1 pattern, which is now 800 ft. from the working face, has maintained a flat pavement. There was a tendency for local fractures through the 6 in. thick grey sandstone. Physical examination showed that these breaks had not penetrated beyond this ply of stone. At some bolts the pavement had lifted 2 in. In the 33 ft. gap which was left between the patterns floor movement soon occurred and a well defined break developed accompanied by the usual pavement lift.

The apparent successful installation of the roof bolts suggests that an extension of the experiment would be warranted. A dominant factor in the success of the trials was the pre-experimental investigation and the strict attention given to all details of the installation. It is considered advisable that conventional supports be set during the trials. The experiment at Cardowan Colliery indicates, at least, that if pavement movement cannot be completely arrested it can be minimized and may enable limited-life panels to be worked trouble free.



## TECHNICAL BRIEFS

### Spheroidal Graphite Cast Iron

A comprehensive publication on the engineering properties of spheroidal graphite cast iron, issued by The Mond Nickel Company Ltd. helps to establish the position of this material relative to other cast ferrous materials. The tensile strength of S.G. iron is about double that of a high-duty flake graphite iron, with a distinct yield point markedly higher than that of malleable cast iron. Elongation is 1.5 per cent in the as-cast condition and 10-25 per cent in the annealed condition, and the elastic modulus, at 25,000,000 p.s.i., approaches that of steel. This combination of high yield strength, high modulus and good elongation together signify that although S.G. iron has sufficient ductility to permit twisting and bending, it is nevertheless stiff and rigid and requires considerable force to cause permanent deformation.

In every field of engineering practice, examples occur where steel has replaced cast iron to meet conditions of stress and shock. The development of S.G. iron enables cast iron to come back into its own for many such purposes. Where grey iron castings are employed and have been designed to the limit of strength of that material, S.G. iron will permit a reduction in section thickness and weight. Indeed, S.G. iron can provide a solution to the problem of the casting which is too heavy for production in malleable cast iron, there being no limit to the size to which castings can be made in S.G. iron.

Although steel castings are superior to S.G. iron castings in ductility and shock-resistance, there are many instances where the properties of S.G. iron are adequate. Because of its good casting properties S.G. iron can be used for intricate work which would be very difficult to produce in steel. Casting in S.G. iron can be used to replace steel forgings for certain purposes. Castings offer substantial production economies over forgings, chiefly because they can be cast close to finished form without heavy machining allowances and also because die and tool costs do not apply.

### Alkaline Pressure Leaching Processes

Leaching processes have been used successfully for many generations to extract and recover metals from ores. Many, such as the cyanide process, zinc leaching, and copper leaching, have stood the test of time—others, for one reason or another, have been tried and abandoned. Essentially if suitable selective solvents can be found and the soluble metals can be recovered from the leach solutions, and particularly if the solvent can be recycled to treat a subsequent lot of ore, leaching operations have the advantage that solutions and pulps can be easily handled and controlled, the dust problem eliminated, and large tonnages handled by a small labour force, thus providing a basis for low treatment costs. These points were emphasized in a paper entitled *Some Aspects of Alkaline Leaching Processes* presented by Mr. F. A. Forward, metallurgical engineer, University of British Columbia, to the American Mining Congress in September of this year.

In the past the majority of leaching operations have been carried out at atmospheric pressure, thus limiting their usefulness, as no advantage could be taken of chemical reactions that take place above the boiling point, nor could volatile leaching agents be easily handled. Also, the solubility of gases such as oxygen and hydrogen is so low at boiling temperatures under atmospheric pressure that operations involving dissolved gases could not be carried out efficiently. The use of autoclaves permits the increase of both temperature and gas pressure in aqueous solutions and thus provides new opportunities for utilizing high temperature reactions. Laboratory and pilot plant studies have proved the feasibility of two processes in which alkaline solvents are used.

The first is an ammonia leaching process which is designed to extract nickel, copper, cobalt and sulphur from sulphide concentrates, and which will be used in the Sherritt Gordon nickel refinery at Fort Saskatchewan. In the pilot plant operations the nickel-copper-cobalt sulphide is agitated with ammonia, water and compressed air in continuous autoclaves. The nickel, cobalt and copper with most of the sulphur go into solution, while iron and silica are discarded as an insoluble residue. The copper is removed from the solution by boiling,

while nickel and cobalt are successively separated and precipitated as metals by hydrogen at high pressure in a second set of autoclaves. The ammonia and sulphur combine to form ammonium sulphate which is recovered as a marketable fertilizer by evaporation. The various operations are controlled automatically, labour requirement is low, high purity products are recovered, and operating cost is expected to be lower than that encountered when using conventional methods.

A different process chemically, yet similar in many respects, is that developed in the laboratory for treating uranium ores by an alkaline pressure leach. In this process the ore containing uranium as pitchblende, and which has also a high content of limestone, is ground, mixed with sodium carbonate solution and charged to continuous autoclaves operating with compressed air at about 100 lb. per sq. in. The pitchblende, oxidized by air, is dissolved while silica, limestone, iron and other gangue materials are discarded. The uranium solution is placed in a second series of autoclaves operating under hydrogen pressure with a small amount of nickel catalyst. The uranium is rapidly precipitated as uranium oxide of purity, meeting the market specifications for a refined product. The sodium carbonate solution is not affected by the precipitation procedure and is recycled to treat a subsequent lot of ore. These two examples illustrate the feasibility of pressure alkaline leaching processes and suggest the avenues that may be opened once the boundaries of boiling point and atmospheric pressure are passed.

### Operation of Mercurial Flow Meter

The KU Mercurial flow meter produced by George Kent is the first step in a new policy of standardization which will embrace the presentation mechanism of a new range of meters to be known as the Commander class, that is the case and front mechanism, including recording, integrating, indicating and automatic control systems.

The KU meter is available for the recording, indication, integration, and automatic control of the flow of oil, water, air, gas, steam and most industrial liquids. It works in conjunction with a Venturi tube, Dall tube or orifice in the fluid pipe-line. Its interchangeable mercury chambers are steel forgings, designed to receive maximum differential pressures of 25, 50, 100, 200, 400 or 600 in. of water (air-on-mercury basis). The 25 in. head chamber withstands a test pressure of 500 p.s.i., and all other chambers 4,000 p.s.i., the maximum working pressures being 250 and 2,000 p.s.i. respectively.

The presentation mechanism can accommodate up to two pens and a pointer, the second pen being for pressure measurement from a pre-calibrated Bourdon tube unit mounted in the case. Over-range protection is provided for the pens in both directions of movement. The pointer rotates on the same axis as the pens, indicating on a crescent-shaped, 8 in. long scale. Light and finely tempered, the pen arm maintains the correct pressure of the pen on the chart without being subject to any torsional movement due to frictional loads.

The integrator, electrically or mechanically driven, is a separate pre-calibrated unit. The entirely new electrical type has a large five-figure cyclometer counter, a range of up to 10:1, a minimum step error, and is unaffected by vibration. The mechanical type uses a direct linkage to operate a tractor-wheel frame instead of the conventional cam, greatly reducing the power absorption from the instrument.

### Research into Heat-Resisting Metals

Three U.S. metal firms have formed a new company, Borolite Corporation, to undertake research and development work on borolites, a group of metal substances reported to be giving promise of ability to withstand high temperatures. A message from New York says that in the initial phases, the three companies, Firth Sterling Inc., American Electro Metal Corporation and the Carborundum Co., will manufacture the borolite products which will be marketed by Borolite Corporation.

Borolite supporters believe that borides, carbides and aluminides, all part of the firm's programme, show promise of withstanding operating temperatures up to 2,000 deg. F. for turbo-jets and up to 7,000 deg. for rocket nozzles.



## METALS, MINERALS AND ALLOYS

**COPPER.**—Copper has been a rather featureless market pending any resumption of negotiations between Chile and the U.S. Administration regarding the disposal of Chilean stocks generally believed to amount to some 120,000 s.tons of which 80,000 s.tons are already in the U.S. The Chilean Senate at the end of last week approved the Committee's four point proposal and an early resumption of negotiations between the Chilean and U.S. Governments is looked for, but there are still further preliminaries to be settled and it is thought special legislation may be required to deal with the exchange and tax provisions, and this may involve extended debate in the Chamber of Deputies.

Meanwhile, discussions between the Central Bank and the Anaconda and Kennecott interests are believed to have been initiated this week looking to the resuming of copper sales, which of course, now that operations have been resumed at Chuquicamata and Potrerillos, may mean the early resumption of sales of new copper to the extent of something between 25,000 and 30,000 tons monthly. Anaconda is stated to have submitted bids to the Central Bank for December delivery on the basis of 30 c. per lb., delivery valley points. The sale of Paipote copper to the Norddeutsche Affinerie reported last week is stated to have been at the price of 29.5 c. per lb. with a further 20,000 tons being under consideration.

It is reported from Northern Rhodesia that the value of the September output was down about £1,000,000 from August, and £2,000,000 from September, 1952. The great bulk of the September output was copper valued at £5,925,894 out of a total production valued at £6,348,186.

The equipment of the White Pine property in Michigan destined it is thought to become one of the largest mines in the North American continent is proceeding steadily, and the first of a battery of giant classifiers has now been shipped in.

According to a New York report the Hudson Bay Mining and Smelting Company has reported development of high grade ore located 13 miles S.W. of Flin Flon, where two parallel ore bodies are being developed, one of which is believed to contain 70,000 s.tons of 10 per cent ore, and another, some 200 ft. to the south, showing 180,000 s.tons of 4 per cent ore so far as present development has gone.

It is announced from Washington that the U.S. Foreign Operations Administration has authorized the purchase of some £700,000 worth of copper, tin-plate, aluminium, and strip iron for Spain; this is the first instalment of the \$85,000,000 aid agreement recently signed.

**LEAD.**—The lead market has presented no particular feature this week. In the United States good foreign buying enabled the price to be held steady at 13½ c. per lb. New York.

**TIN.**—There has been a spectacular rise in tin quotations since our last and cash touched £670 per ton with three months £646 5s. on first change on Tuesday. In the United States prices too recovered to 86.25 c. per lb. Explanation for these fireworks is to be sought in the proceedings of the Tin Conference at Geneva which ended its deliberations on Tuesday night after completing a draft agreement which delegations will take back to their governments for study. Particulars of this draft agreement appear on the page overleaf, while comment on its significance appears in this issue under "Notes and Comments" and under "London Metal Market."

The proceedings wound up much earlier than was expected and material changes in the original draft appear to have been made.

It is understood that the Conference has devised a system whereby the agreement could come into force without United States ratification. Instead of depending on ratification by countries representing a fixed percentage of production and consumption, the text has been changed so that only a straight majority of consumer and producer countries need ratify the agreement to bring it into force. The United States alone, however, is responsible for about 54 per cent of world tin consumption, the remainder being divided between 17 other major consuming countries.

Indonesian output in November is reported at 2,770 tons of metal making the total for the 11 months 30,606 tons compared with 31,827 for the same period last year. Imports of concentrates into the Straits in November totalled 739 tons—515 from Thailand and 224 from Burma. The gradual increase of shipments from Burma is worth noting. Output of the Longhorn smelter in November was 2,750 tons against 2,751 in October, and 2,700 in September. This uniformity is in striking contrast to fluctuation in the earlier part of the year suggesting that the returns are conforming to a close schedule. Total

production for the current 11 months is 34,901 tons compared with 18,836 in the same period last year.

The strike at the American Can and Continental Co.'s works continues.

**ZINC.**—Despite production of slab zinc by smelters in the U.S. in November slab zinc stocks at the end of the month had risen to 165,563 s.tons, just double the figure of the year previous. November output was 75,830 s.tons as compared with 84,031 s.tons in October.

Special high grade continues to gain on prime Western with a total of 27,216 s.tons compared with 33,021 s.tons. Electrolytic high grade is now quoted 11.50 c. per lb. United States consumer demand remains slow, but it is hoped that improved foreign buying will more or less take care of the pressure of foreign metal on the U.S. market.

**COLUMBIUM/TANTALUM.**—As a result largely of the U.S. Government's incentive bonus purchase programme, imports of columbite/tantalite concentrates into the U.S. showed a big increase last year. Figures for the first 9 months totalled 1,649,559 lb. of columbium pentoxide and 404,836 lb. for tantalum pentoxide; figures for the corresponding period of last year were 1,030,676 lb. and 244,709 lb. respectively.

The great bulk of the supply came from Nigeria amounting to 1,379,485 lb. of columbite and 216,285 lb. of tantalite. Tantalum is now being increasingly used as a substitute for columbium, or in combination with it, in the production of high temperature alloys, and ferro tantalum-columbium is reported to have now become the chief channel of consumption.

**TUNGSTEN.**—We are unable to hear of any dealings in tungsten this week and the market is virtually dead. Manufacturers of ferro and powder have lowered their price by 1s. per lb., to 16s. 6d. for powder and 13s. 6d. for ferro.

The Commissioner of the Emergency Procurement Service of the G.S.A. has recommended that the four Thailand contracts to provide the U.S. with some 3,500 units of tungsten concentrates be permanently cancelled owing to irregularities which have developed.

When tungsten prices advanced Thailand deliveries are said to have fallen off considerably and after the market broke deliveries were heavily accelerated. Moreover Thailand producers bought on the world market to enhance their own production under the contract sale price of \$65. Such operations no doubt contributed to create an artificial market, the reaction to which is now being experienced.

**URANIUM.**—South Africa's fourth and biggest uranium production plant was opened last week by the Minister of Mines, Dr. Albertus van Rhyn. It is situated at the Western Reefs mine and includes a sulphuric acid plant. The capital cost of the Government's uranium programme has now risen to around £50,000,000, estimated to give an annual gross revenue in excess of £30,000,000. Twenty-three mines have been admitted to the programme.

### Iron and Steel

Imports of iron and steel touched their lowest point in the month of October. The total tonnage which arrived from overseas in the first ten months of the year was 500,000 tons less than in the corresponding period of last year. The rise in the volume of iron and steel exports is not so steep but the inference is clear. This industry is approaching the point when it can sustain an export trade expansion, and at the same time reduce the intake of marginal supplies of steel semis from the Continent to very small proportions.

Business in iron and steel has slowed down a little. That is the customary experience before the holidays but the works have plenty of orders to carry them over to the end of the year and the active resumption of trading cannot be long delayed, as consumers have yet to cover the bulk of their requirements for the first quarter of 1954. These are known to be heavy, particularly in the engineering, shipbuilding and motor industries.

Rollers of heavy joists and sections admit that replacement orders are not coming along, as rapidly as deliveries are being despatched but there are still considerable back-logs of uncompleted contracts. For flat steel products the demand is positively overwhelming. Steel plates figure prominently in the list of imports and it looks as though these purchases abroad will have to be continued for a long time ahead to ensure adequate supplies for the shipyards.

The strength of the sheet trade also is simply phenomenal. For the six months ending December 31 bigger export quotas

have been taken up than for any similar period since the end of the war and some big shipments have yet to be made to complete these contracts. There has also been a big expansion in the demands of home consumers and buyers of light sheets who have yet to cover their requirements are confronted with the prospects of long waiting periods, producers of hoop and strip as well as black and galvanized sheets having already accepted commitments extending as far ahead as the second quarter of next year.

Under these circumstances it is not surprising to learn that at their new open hearth steel plant at Lackenby, Dorman Longs have brought two more 360 ton tilting furnaces and a 600 ton mixer into production. A fifth steel furnace will be lighted early in the new year and the whole plant will then have an annual capacity of over 600,000 ingot tons. The next stage will be the construction of the new universal beam mill which is not expected to be completed in less than three years.

As from Tuesday last control over all iron and steel maximum prices except those of scrap has been relinquished by the Minister of Supply and taken over by the Iron and Steel Board. In making this announcement Mr. Duncan Sandys stated that no price changes are contemplated "except in a few minor instances."

## The International Tin Agreement

Advance particulars of the draft of the International Tin Agreement, received through Reuters, are as follows:

The International Tin Agreement, which has been worked out at the 30-nation United Nations tin conference here, will be open for signature in London from March 1 to June 30 next year. The Agreement establishes an International Tin Council with its headquarters in London. Until the Agreement is ratified by the stipulated number of producers and consumers, an interim committee is set up to facilitate the establishment of the Council.

The Agreement lists six major producing countries in one group and 18 consumer countries in another group, each group having 1,000 votes. The Agreement comes into force when at least nine consumer countries having a minimum of 333 votes and a number of producing countries having 900 votes have ratified or accepted it.

For the Agreement to operate, Malaya, Bolivia and Indonesia must ratify it as they have the largest number of producer votes. For the consumers, the ratification of the United States, which alone has 490 votes, is theoretically not essential for the Agreement to come into force. Britain has 145 votes and the remaining votes are divided among the 16 other listed consumer countries, none of which has more than 55 votes.

In Article Six of the draft Agreement, dealing with minimum and maximum prices, the initial floor price is set at £640 per ton and the ceiling price at £880. The Article lays down that these prices can be revised if necessary.

The Agreement sets up a buffer stock of tin metal to be contributed by the producer countries. This buffer stock will consist of contributions in tin metal and cash to enable the Tin Council to acquire up to 25,000 tons of tin metal. Three-quarters of these contributions from producers will be in tin metal and the remainder in cash.

The Agreement also provides for the establishment of export controls when the buffer stock has absorbed a minimum of 10,000 tons and also when it is deemed necessary by market conditions. The Article on export control declares: "The Council shall estimate the probable demand for tin during a period of three calendar months and the probable increase or decrease of commercial stocks during that period. In the light of these estimates, quantities of tin metal held in the buffer stock, the current price of tin and any other relevant factors, the Council may by a distributed simple majority fix the total permissible export amount for that period."

The buffer stock will be operated by a buffer stock manager, who is authorized to sell tin if the price on the London tin market rises above £800 and may buy if the price falls below £720.

## The London Metal Market

(From Our Metal Exchange Correspondent)

The prices of lead and zinc have continued to fluctuate within narrow limits, and the lack of any definite trend continues. Demand is good for the time of the year.

The copper price remains steady but more interest has recently been shown in the forward market. There is a scarcity of wirebars outside long-term contracts, and if a sudden demand should develop after the turn of the year buyers must be prepared to pay the American price, which is already £240 a ton and over, c.i.f., for January/February arrival.

It is still too early to say what effect the Geneva communiqué

is likely to have on the tin situation during the next six months, but it appears that a "floor" price of around £640 per ton can be regarded as being established. The communiqué, which is printed fully elsewhere, leaves many questions unanswered, but it appears it is mainly an agreement whereby producers agree to restrict their outputs and have the advantages of a buffer pool to iron out any miscalculations which may be made about the future consumption on which actual production is based. The size of the buffer pool seems insufficient for any other purpose in view of the existing American stocks and the fact that the "floor" price level agreed seems unlikely to cut down existing production on economic grounds. The consumers have apparently agreed to a price level which is higher than pure economics justify, but have obtained some safeguard against prices rocketing to enormous heights in the event of a sudden demand springing up after producers have cut down their outputs. The first step, however, is for the agreement to be ratified by a sufficient number of nations, and until then it seems unlikely there will be any further violent fluctuations in the market. On Thursday morning the Eastern price was equivalent to £662 per ton c.i.f. Europe.

Closing prices and turnovers for the week are given in the following table:

	December 3		December 10	
	Buyers	Sellers	Buyers	Sellers
<b>Tin</b>				
Cash .....	£627½	£632½	£655	£660
Three months .....	£615	£617½	£640	£642½
Settlement .....	£630		£657½	
Week's turnover .....	585 tons		785 tons	
<b>Lead</b>				
Current month .....	£91½	£91½	£90½	£90½
Three months .....	£89½	£89½	£88½	£88½
Week's turnover .....	5,225 tons		5,225 tons	
<b>Zinc</b>				
Current month .....	£74½	£74½	£74½	£74½
Three months .....	£74½	£74½	£74½	£74½
Week's turnover .....	3,675 tons		4,000 tons	
<b>Copper</b>				
Cash .....	£233	£233½	£234½	£235
Three months .....	£224	£224½	£224½	£224½
Settlement .....	£233½		£235	
Week's turnover .....	5,025 tons		4,650 tons	

## OTHER LONDON PRICES—DECEMBER 10

### ANTIMONY

English (99%) delivered,	
10 cwt. and over .. ..	£210 per ton
Crude (70%) .. ..	£200 per ton
Ore (60% basis) .. ..	22s./24s. nom. per unit, c.i.f.

### NICKEL

99.5% (home trade) .. ..	£483 per ton
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### OTHER METALS

Aluminium, 99.5% £150 per ton	Osmiridium, £40 oz. nom.
Bismuth .. ..	Osmium, £65/£70 oz. nom.
(min. 4 cwt. lots) 16s. lb.	Palladium, £7 15s./£8 10s. oz.
Cadmium (Empire), 13s. 10d./	Platinum, £27/£33 5s.
14s. 4d. lb.	Rhodium, £42 10s. oz.
Chromium, 6s. 5d./7s. 6d. lb.	Ruthenium, £25 oz.
Cobalt, 20s. lb.	Quicksilver, £61 15s.
Gold, 248s. f.oz.	ex-warehouse
Iridium, £60 oz. nom.	Selenium, 30s. 6d. nom.
Magnesium, 2s. 10½d. lb.	per lb.
Manganese Metal (96%-98%)	Silver 73½d. f.oz. spot and f'd.
£225/£262	Tellurium, 15s./16s. lb.

### ORES, ALLOYS, ETC.

Bismuth .. ..	50% 7s. 3d. lb. c.i.f.
	40% 6s. 3d. lb. c.i.f.
<b>Chrome Ore—</b>	
Rhodesian Metallurgical (lumpy)	£14 8s. 0d. per ton c.i.f.
" " (concentrates)	£14 8s. 0d. per ton c.i.f.
Refractory .. ..	£14 0s. 0d. per ton c.i.f.
Baluchistan Metallurgical ..	£15 19s. 6d. per ton c.i.f.
Magnesite, ground calcined ..	£26 - £27 d/d
Magnesite, Raw .. ..	£10 - £11 d/d
Molybdenite (85% basis) ..	102s. 4d.-103s. per unit c.i.f.
Wolfram (65%) .. ..	World buying £185-£195
" .. ..	195s. nom. U.K. Selling
Scheelite .. ..	World buying £170-£180
" .. ..	180s. nom. U.K. Selling
Tungsten Metal Powder ..	16s. 6d. nom. per lb.
(98% Min. W.) .. ..	(home)
Ferro-tungsten .. ..	13s. 6d. nom. per lb. (home)
Carbide, 4-cwt. lots .. ..	£35 13s. 9d. d/d per ton
Ferro-manganese, home ..	£52 10s. 0d. per ton
Manganese Ore Indian c.i.f. Europe	
(46% - 48%) .. ..	7s. 11d. - 8s. 4d. per unit
Brass Wire .. ..	2s. 5½d. per lb. basis
Brass Tubes, solid drawn ..	1s. 10d. per lb. basis

(By Our Stock Exchange Correspondent)

Orange Free State shares mostly followed the lower trend

In the lead/zinc section, Mawchi ordinary were down to 7s. 7½d. and the notes to 1952, against 10s. and 200 last week. The market is clearly adopting a wait and see policy over the better news from Burma. Burma Mines were lower, but it is encouraging that the Corporation made a profit of some £10,000 for the quarter to June 30. There was also an improvement in the labour force and mining efficiency.

FINANCE	Price Dec. 9	+ or - on week	O.F.S.	Price Dec. 9	+ or - on week	MISCELLANEOUS GOLD	Price Dec. 9	+ or - on week	TIN (Nigerian and Miscellaneous) contd.	Price Dec. 9	+ or - on week
African & European.....	2	-	Freddies	9/-	+ 3d	(contd.)					
Anglo American Corp.....	54 1/2	-	Freddies N.	8 7/8	+ 4 1/2	Tin. St. John d'El Rey.....	22 1/2	- 3d	Geevor Tin	9 9	+ 1 1/2
Anglo-French.....	17 1/2	- 6d	Freddies S.	8 3/8	+ 1 1/2	Zams	31 3/8	+ 9d	Gold & Base Metal.....	3/-	
Anglo Transvaal Consol.	20/-		F. S. Geduld	2 1/4	-	<b>DIAMONDS &amp; PLATINUM</b>			Jantar Nigeria	8 3/8	- 4 1/2
Central Mining (£1 shrs.)	28 3/8		G. Geoffries	13 9	- 6d	Anglo American Inv.	4 1/2		Jos Tin Area.....	12 1/2	- 9d
Consolidated Goldfields	48 9	- 6d	Harmony	25 1/2	- 9d	Casta	21 3/8	+ 6d	Kaduna Prospectors	2 1/2	+ 1 1/2
Consol. Mines Selection	26 10 1/2	+ 7 1/2	Lorraine	8/-	-	Cons. Diam. of S.W.A.	4 1/2		Kaduna Syndicate	2 1/2	+ 3
East Rand Consols	3/-		Lydenburg Estates	11 1/2	- 6d	De Beers Deft. Bearer	68 3/8	+ 1 1/2	London Tin	5 3	
General Mining	3 1/2		Merriespruit	8 3/8	+ 3d	De Beers Inv. Bearer.....	13 1/2	- 6d	United Tin	3 3/8	- 1 1/2
H.E. Prop.	36 10 1/2		Middle Wits	18/-	- 1 1/2	Pots Platinum	13/-		<b>SILVER, LEAD, ZINC</b>		
Henderson's Transvaal.	7 1/2	- 3d	Ofists	35/-	- 1 1/2	Watervaal	13/-		Broken Hill South	42 1/2	
Johnnies	45 1/2	- 3d	President Brand	28 7/8	+ 1 1/2	<b>COPPER</b>			Burma Mines	1 9	- 3d
Lead Mines	29 4 1/2	- 1 10 1/2	St. Helena	16/-	- 9d	Chartered	52 9	+ 6d	Consol. Zinc	25 9	- 6d
Rand Selection	32 1/2	- 7d	Virginia Ord.	11 3	- 7 1/2	Esperanza	7 1/4	+ 1 1/2	Lake George	7 1/4	- 1
Strathmore Consol.	26 9	+ 9d	Welkom	16 1/2	- 1 1/2	Indian Copper	4 1/2	+ 3d	Mount Isa.	30 9	- 1 1/2
Union Corp. (2 1/2 units)	32 1/2	- 6d	Western Holdings	3 1/2	-	Messina	3 1/2	- 1 1/2	New Broken Hill	22 1/2	
Verreiging Estates	32 1/2	- 6d	<b>WEST AFRICAN GOLD</b>			Nchanga	6 1/2	- 1 1/2	Rhodesian Broken Hill	10 9	- 1 1/2
West Wits	41 10 1/2	- 1 1/2	Amalgamated Banket	1 7/8	- 2d	Rhod. Anglo-American	14 1/2	- 4 1/2	Rhodesian Rhodes	17 3	- 3d
			Ariston	5 9	- 7 1/2	Rhod. Katanga	13 10 1/2		Sa Francisco Mines	2 6	
			Ashtani	19 10 1/2	- 7 1/2	Rhokana	18	- 1 1/2	<b>MISCELLANEOUS</b>		
			Bibiani	2 1 1/2	-	Rio Tinto	20		<b>BASE METALS &amp; COAL</b>		
			Bremam	2 1 1/2	-	Roan Antelope	13 1/2		Amal. Collieries of S.A.	42 1/2	
			G.C. Main Reef	6 3	- 1 1/2	Selection Trust	3 3 9	- 7 1/2	Associated Manganese	53 3	- 9d
			G.C. Selection Trust	2 1/2	- 1 1/2	Tanks	58 6 1/2	+ 3d	Cape Asbestos	23 1/2	+ 1 1/2
			Konongo	6 3	- 1 1/2	Thariss Sulphur Br.	42 1/2		C.P. Manganese	52 6	+ 7 1/2
			Lyndhurst Deep	1 1/2	-	<b>TIN (Eastern)</b>			Consol. Murchison	26 3	- 1 1/2
			Marlu	1 6	-	Ayer Htam	23 1/2	- 3d	Mashaba	2 1 1/2	
			Taquah & Abosso	2 1/2	-	Bangrin	8/-		Natal Navigation	2 1 1/2	
			<b>AUSTRALIAN GOLD</b>			Gongeng	8/-		Rhod. Monteleo	1 3	
			Boulder Perseverance	2 1/2	-	Hongkong	6 1/2	+ 6d	Turner & Newall	64 3	- 1 1/2
			Gold Mines of Kalgoolie	13 1/2	-	Ipo	15 1/2	- 7 1/2	Wankie	12 9	
			Great Boulder Prop.	8 1 1/2	- 4 1/2	Kamunting	8 9		Witbank Colliery	3 1 1/2	
			Lake View and Star	14/-	-	Kesong Dredging	4 3		<b>CANADIAN MINES</b>		
			Mount Morgan	17 1/4	-	Kinta Tin Mines	10 4 1/2	+ 1 1/2	Dome	52 1/2	
			North Kalgarli	6 3	- 3d	Mahany Dredging	25 9		Hollinger	52 3	
			Sons of Gwalla	5 6	-	Pahang	12 3		Hudson Bay Mining	57 5 1/2	- 5
			South Kalgarli	8 1/2	- 1 1/2	Pengkalen	8/-	+ 4 1/2	International Nickel	56 7 1/2	- 1 1/2
			Western Mining	10 10 1/2	-	Petaling	8 1/2	+ 6d	Mining Corp. of Canada	53 1/2	- 1 1/2
			<b>MISCELLANEOUS GOLD</b>			Rambutan	11 1/2	- 1 1/2	Noranda	51 7	- 3
			Cam and Motor	9 4/4	+ 1 1/2	Chinese Tin	12 7 1/2	xd	Queumont	1 5 1/2	- 1 1/2
			Champion Reef	4 1/2	-	Southern Kinta	23 9	- 6d	Yukon	3 9	+ 1 1/2
			Falcon Mines	7/-	-	S. Malayan	7 1/4	+ 1 1/2	<b>ANGLO-IRANIAN</b>		
			Globe & Phoenix	21 9	-	S. Tronoh	10/-		Anglo-Iranian	8 1/2	+ 1 1/2
			G.F. Rhodesian	5/-	- 3d	Sungei Kinta	4 7 1/2	+ 1 1/2	Apex	45/-	+ 3d
			London & Rhodesian	4 7/8	-	Tekka Taiping	22 3	+ 3d	Altrock	35 1/2	+ 6d
			Metapa	1 10 1/4	+ 3d	Tronoh			Burmah	56 3	+ 9d
			Mysore	5 1/2	- 1 1/2	<b>TIN (Nigerian and Miscellaneous)</b>			Canadian Eagle	28 1/2	- 3d
			Nynderdroog	4 6	-	Amalgamated Tin	11 7 1/2	+ 1 1/2	Canadian Eagle	22 4 1/2	- 9d
			Ooregum	3 1 1/2	- 1 1/2	Beral Tin	19 6	- 1 1/2	Shell (bearer)	98 9	+ 3 1/2
			Oroville	11 9	-	Bitshi	4 7 1/2		Trinidad Leasehold.	34 3	- 1 1/2
						British Tin Inv.	12 9	- 4 1/2	U.P.D.	22 3	- 3d
						Ex-Lands Nigeria	3 6		Ultramar	29 4 1/2	- 1 1/2



## COMPANY NEWS AND VIEWS

### Anglo-Transvaal Maintains Dividend at 50 per cent

The profit and loss account of Anglo Transvaal Consolidated Investment Company for the year ended June 30, 1953, provides more detailed information than in previous years, so that a much clearer idea emerges as to how the total income figure for the year of £810,717 was achieved.

Year to June 30	Net Revenue £	Gross Revenue £	Tax- ation £	Net Profit £	Divi- dend %	Carry Forward £
1953	303,193	810,787	138,000	626,843	50	401,611
1952	253,815	774,205	135,000	601,801	50	353,860

Net revenue is still, however, an omnibus item and the figure of £303,193 represents net revenue from interest, commissions, fees, and sundry revenue, after deducting administration, office and sundry expenses. Dividend income, at £271,656 against £284,845, was relatively steady, but profit on realization of investments jumped from £55,277 to £188,593.

Taxation liabilities were virtually unchanged, the dividend on the Ordinary and "A" shares for the fourth year in succession was maintained at 50 per cent and the forward balance at the financial year end was £401,611 compared with £353,860. The balance sheet showed that at the end of June last the net current assets, exclusive of investments, amounted to £639,591.

Mr. S. G. Menell is chairman. Meeting, Johannesburg, December 18.

### West Wits: The End of the Beginning

The publication for the first time of Doornfontein Gold Mining's monthly production figures—noted elsewhere in these columns—marks the end of the beginning of the "West Wits Line."

In the early '30's, Dr. Reinecke and the late Mr. Carleton Jones started operations to trace the magnetite bearing shales and, by inference, the Main Reef Group of the lower Witwatersrand system. Confidence in the potential importance of this area was well founded and with Doornfontein in production the "West Wits Line" to-day supports five gold producers, West Driefontein, Doornfontein, Libanon, Blyvooruitzicht, and Venterspost.

The foregoing data is, of course, particularly germane to West Witwatersrand Areas, the company Consolidated Goldfields formed 21 years ago for the purpose of investigating the potentiality of the Far Western Rand where the existence of the Witwatersrand system beneath the younger rocks was expected, particularly by the late Mr. G. Carleton Jones.

Thus the financial history of West Witwatersrand Areas is largely the history of the development of the Far Western Rand, and just as mining operations expanded to the point where dividends could be paid, so the revenue of West Wits has increased.

During the year to June 30 last, the untaxed profit of West Wits was £625,251, an increase of no less than £148,492 over the preceding year. Taxation took £43,883 (£21,443), of which £16,094 was attributable to underprovision in respect of normal tax and undistributed profits tax in past years.

The dividend distribution was raised from 1s. 3d. to 1s. 7½d. per 2s. 6d. share on the £840,840 issued capital, which required £546,546 against £420,420 in the preceding year. This increased distribution was, in part at any rate, assisted by the maiden distribution of West Driefontein, although a reduction in drilling expenses from £45,265 to £31,325 was also an important factor. The carry forward at the financial year end amounted to £147,484 compared with £112,662.

The outlook for the company is indeed bright. West Driefontein has come to be regarded as one of the richest mines in the world and in the first full year of operation it was able to provide for all capital expenditure out of profits as well as pay a maiden dividend of 6d. per share. And while capital expenditure continues to be heavy, profits during its current financial year should be at a sufficiently high level to enable a higher dividend distribution to be made. "Blyvoors" is another gold producer to which the adjective "phenomenal" can be applied and though profits during the year to June 30 last were lower, owing to labour shortages, the dividend was maintained. Libanon is forging ahead and the mine is opening up well. But the necessity to sink a third shaft to ensure future ore supplies will require considerable capital expenditure which will, as Mr. S. R. Fleischer, chairman of West Witwatersrand Areas said in his annual statement, delay any increase in the dividend rate. Venterspost is still incurring heavy capital expenditure on its shaft systems but once this task has been completed the main pay shoot areas of the mine will be avail-

able and the company will receive the full benefits from the expansion of its mill. Doornfontein came into production last month and announced a profit on the month's operations of approximately £6,500 which was indicative of the excellent progress made at the mine both with development and shaft sinking thereby enabling crushing to commence at a much higher rate than previously forecast.

The foregoing favourable comment taken in conjunction with the fact that three of the mines on the West Wits Line, Blyvoors, West Driefontein and Doornfontein, are scheduled uranium producers all helps to impart a healthy financial complexion to the growing West Witwatersrand Areas which attained its majority this year. Indeed, it would appear eminently reasonable to state that before this company is much older its dividend revenue will be substantially higher and shareholders' income considerably improved.

### Gold Fields Rhodesian Conserves Its Resources

Although unfavourable markets during the year ended May 31 last were responsible for the fall in revenue from the sales of investments of the Gold Fields Rhodesian Development Company by £35,627 to £18,567, profit realized on property sales rose by £27,380. The company's gross dividend income remained comparatively stable, £48,740 against £49,800, and these three items were the major components comprising total income received during the year.

Year to May 31	Total Income £	Working Profit £	Tax- ation £	Net Profit £	To Reserves £	Carry Forward £
1953	106,962	65,468	23,068	42,400	50,000	5,514
1952	119,970	72,345	23,655	48,690	80,000	4,572

Surplus profits were less than those achieved last year and in view of the cash requirements needed by the company for exercising its rights and for development of mining property, no dividend payment has been made. Further details of the company's operations during the year are given in the statement by Robert Hannan, chairman, which appears on page 702.

### Burma Corporation Continues to Make Good Progress

Burma Corporation (1951), in which Burma Mines Ltd. and the Burmese Government each holds a half interest, was able to announce a profit of £10,215 in the quarter ended June 30, compared with a loss of £55,650 in the March quarter. Behind these better figures was the much higher rate of ore extraction, which at 12,218 tons represented an increase of 22.3 per cent over the March quarter when 9,991 tons were extracted. Unfortunately, the good results reported for the June quarter were completely absorbed in reducing the deficit accumulated during the previous 9 months to £166,432.

Since the rate of ore extraction has shown perceptible increases each quarter it would, perhaps, be more apposite when trying to assess the future outlook for the company to dwell upon the last quarter's results, not only because they are the result of the continued progress made over the whole year, but also the current situation is being met with a slightly increased labour force which, the company reports, is now settling down and beginning to show increasing efficiency.

The full year's metal production amounted to 3,740 tons of refined lead, 5,000 tons of zinc concentrates (57/58 per cent Zn), 405,914 oz. silver, 166 tons refined antimonial lead (12 per cent Pb), 65 tons copper matte and 171 tons of nickel speiss. Further details are given on page 701.

### Rand and O.F.S. Returns for November

With the majority of the gold producers listed in the table below nearing the end of their current financial year, it may be useful at this time to compare their cumulative profits to date with those achieved in the corresponding period of the previous year. The word "may" is used advisably, as any comment based on these figures can only be very approximate. This, of course, is made quite clear in the footnote to the table which forewarns readers that profit figures do not include revenue received from premium gold sales, and in the case of several of the companies, it does not take into account sundry revenue, which can be considerable, nor does it include revenue received from uranium. Even so, the picture presented by the 51 producers cannot be described as better than disappointing.

Of the 37 companies whose current financial year ends next month only Robinson Deep and Vogels in the Goldfields Group, and Crown Mines in the Central Mining Group are



able to report improvements over the corresponding period a year ago. This does not include any of the newer mines, and by newer mines is meant all those which have come into production over the last two years. Indeed, even if the companies whose year ends in January, so that the cumulative figure to date represents only five months of their current financial year, only two more companies can show an improvement, Libanon and Wit Nigel. By any reckoning this can hardly be described as heartening, either for shareholders or the companies. A quite different picture is presented, however, when the newer mines are considered as can be seen from the table.

Perhaps the outstanding feature of the November returns has been the entry into the list of producers of Doornfontein Gold Mining, the "West Wits Line" producer in the Goldfields Group. The other point worthy of note is that Witwatersrand Gold, in the "Johnnies" group, ceased production during the month.

Company	November, 1953			Tr. ends	Current Financial Year			Tr. ends	Last Financial Year		
	Tons (000)	Yield (oz.)	Profit (£000)		Year Total to Date				Year Total to Date		
					Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)
<b>Gold Fields</b>											
Doornfontein	40	10,227	6.6	J	40	10,227	6.6	—	—	—	—
Libanon	88	17,988	45.6	J	425	86,378	217.9	415	83,058	213.3	256.3
Luipaards Vlei	104	19,254	39.3	J	527	97,616	207.8	508	96,230	256.3	256.3
Rietfontein	27	6,091	24.0	D	294	65,691	275.4	296	66,096	302.3	302.3
Robinson	92	18,861	13.0	D	1065	208,569	144.0	1231	204,436	134.3	134.3
Simmer & Jack	126	20,156	12.9	D	1349	117,866	141.0	1362	217,487	177.3	177.3
Sub Nigel	66	21,995	101.1	J	333	110,507	513.6	330	114,093	593.3	593.3
Venterspost	106	24,910	56.1	J	522	122,402	280.9	523	119,766	314.2	314.2
Vlakfontein	38	13,679	73.6	D	406	147,321	792.5	409	151,800	867.1	867.1
Vogels	102	25,908	107.4	D	1078	272,414	1102.1	897	233,618	918.7	918.7
West Dri	45	32,981	260.6	J	222	158,154	1266.4	130	80,869	588.7	588.7
<b>Anglo American*</b>											
Brakpan	114	20,402	23.0	D	1263	225,990	248.3	1297	233,468	389.7	389.7
Daggas	214	50,073	307.6	D	2398	564,555	3601.1	2556	608,392	4275.5	4275.5
East Daggas	95	16,196	48.4	D	1009	174,745	534.9	1049	186,766	678.1	678.1
S. A. Lands	102	18,674	52.8	D	1103	201,312	566.9	1210	218,028	758.9	758.9
Springs	137	18,888	8.5	D	1601	220,300	111.7	1799	237,466	207.8	207.8
Welkom	67	13,103	4.0	D	693	135,561	118.3	550	95,448	L 29.1	L 29.1
Western Hldgs.	46	12,492	29.0	D	196	52,116	81.0	—	—	—	—
W. Reef Ex.	111	22,272	71.6	D	1201	245,116	866.7	1234	257,439	1122.2	1122.2
<b>Central Mining</b>											
Blyvoor	92	54,281	433.6	J	501	296,381	2444.2	533	322,038	2796.3	2796.3
City Deep	165	31,175	20.1	D	1759	339,745	236.3	1693	343,751	281.5	281.5
Consol M. R.	162	22,719	19.2	J	853	117,587	97.7	923	127,320	144.0	144.0
Crown	275	43,396	52.0	D	1001	475,593	467.3	9992	476,137	434.6	434.6
D. Roodport	178	29,006	53.7	D	1965	328,833	692.4	1996	343,872	927.0	927.0
East Rand Prop.	189	43,403	123.5	D	2087	463,948	1240.6	2260	486,544	1578.9	1578.9
Modder B.	54	5,751	3.0	D	598	64,003	20.8	621	68,490	68.0	68.0
Modder East	104	12,225	12.9	J	579	65,816	74.0	585	67,784	114.1	114.1
Rose Deep	68	10,405	10.1	D	799	119,068	95.2	909	126,782	107.6	107.6
Welgedacht	32	3,960	2.2	J	170	20,938	15.2	171	20,873	22.5	22.5
<b>J.C.L.*</b>											
E. Champ d'Or	23	3,110	L 3.0	D	265	40,780	L 9.7	329	50,566	90.8	90.8
Freddies North	23	4,999	L 20.0	D	124	21,290	L 112.3	—	—	—	—
Freddies South	30	5,003	L 14.4	D	141	23,866	L 92.7	—	—	—	—
Govt. G.M.A.	240	32,004	30.0	D	2703	363,799	550.6	2693	354,678	565.3	565.3
New State	16	3,391	1.0	D	294	47,620	11.1	498	69,010	11.2	11.2
Randfontein	304	37,527	25.1	D	3367	428,824	292.1	3822	455,937	326.1	326.1
Wit Gold	5	845	L 23.1	D	487	55,446	L 112.1	658	78,333	27.2	27.2
<b>Union</b>											
East Geduld	125	38,127	274.4	D	1482	445,903	3311.8	1587	476,142	3762.3	3762.3
Geduld Prop.	88	14,263	23.4	D	1035	164,734	337.9	1151	167,023	379.7	379.7
Grootvlei	175	37,185	202.9	D	2023	430,947	2514.2	2126	460,540	2943.1	2943.1
Mariavale	60	14,768	64.0	D	687	167,976	729.8	665	166,744	775.3	775.3
St. Helena	74	15,481	4.0	D	723	146,133	272.6	540	106,989	72.5	72.5
Van Dyk	75	13,448	2.4	D	943	155,220	12.9	1151	168,576	131.0	131.0
<b>General Mining*</b>											
S. Roodport	26	5,770	20.0	J	138	30,033	102.3	136	30,911	116.9	116.9
W. Rand Cons.	216	28,654	71.1	D	2443	337,855	937.8	2392	366,585	1369.6	1369.6
<b>Anglo Transvaal*</b>											
N. Klerksdorp	11	1,505	0.6	D	117	15,746	6.7	124	14,220	11.2	11.2
Rand Leases	160	27,601	13.2	J	802	137,467	68.3	915	152,576	298.4	298.4
Village M. R.	34	5,255	12.0	J	170	26,511	60.0	169	26,450	74.0	74.0
<b>Others</b>											
N. Kleinfontein	108	13,686	20.3	D	1183	152,261	276.1	1182	153,989	343.8	343.8
Sparwater	10	2,479	L 2.7	D	114	26,350	L 33.4	115	25,160	L 26.7	L 26.7
Stilfontein	70	21,358	110.4	D	708	207,466	1034.6	237	50,268	76.3	76.3
W. Nigel*	17	3,979	8.6	J	86	19,536	39.1	84	—	—	37.1

Notes.—Profit figures are in all cases figures of working profit excluding profit from sale of gold at premium prices. In case of groups marked with an asterisk (\*) profit includes sundry revenue. Profit figures preceded by L indicates a loss.

† Excluding development expenditure.  
‡ Operations ceased during the month.

### Pahang Consolidated Reduces Dividend to 55 per cent

Pahang Consolidated, the big tin lode mine, must be one of the few tin producers which is against any form of a tin restriction scheme. This is, of course, entirely understandable as with a lode mine it is necessary to maintain a large skilled force of hard rock miners and to handle a pumping problem of considerable magnitude, both of which items involve heavy overhead costs. Thus how far and to what extent the company's costs can be reconciled with the "floor" and "ceiling" prices

provisionally agreed on and referred to in this issue on page 696, must await a further statement from Mr. D. T. Lewis, the company's chairman.

During the year under review the company's profit margins came under pressure, both from an increase in working costs of nearly £17 per ton of concentrate produced and a decrease in the price received of over £60 per ton. These adverse features were reflected in the drop in working profits achieved during the year from £844,027 to £590,756. Taxation was lighter, £313,575 against £487,150, and after taking into account all other expenses the balance available for distribution to stockholders was down from £320,160 to £131,561.

The smaller profit margin available meant that the dividend payments were reduced. In the event, the total distribution for the year was cut back by 30 per cent to 55 per cent per 5s. stock unit which required £121,688 against £175,219, leaving the forward balance approximately £10,000 higher at £79,581. Meeting, London, December 17.

### London and Rhodesian Mining Strengthens Its Reserves

London and Rhodesian Mining and Land has an interesting spread of assets and in addition to its mining investments, it operates mining properties, has real estate, ranching and agricultural interests, while recently it branched out into tobacco growing.

Year to June 30	London Income	S. Rhodesian Income	Net Profit*	Dividend %	To Reserve	Carry Forward
1953	42,698	156,049	53,616	6	20,000	36,814
1952	40,221	129,349	38,298	6	7,230	34,698

\* After providing for taxation of £44,808 (1952 - £46,765).

During the year ended June 30 last, its net profit, after providing for all expenses, including U.K. and Southern Rhodesia taxation totalling £44,808 (£46,765), advanced from £38,298 to £53,616. Shareholders did not participate in the improved results but the general reserve was strengthened by the allocation of £20,000 which raised that account to £109,768, while the forward balance was also left slightly stronger.

Sir Joseph Ball is chairman and managing director. Meeting, London, December 8.

### Southern Rhodesian Gold Returns—October

In last week's issue of *The Mining Journal* we published for the first time monthly production figures of some of the leading gold producers in Australia as well as for companies situated in various countries of the world in our Miscellaneous Gold table. This week we publish monthly production returns for some of the leading gold producers in Southern Rhodesia together with their cumulative production and profit figures to-date and those obtained during the corresponding period of the preceding year.

Company	October, 1953			Mths. since start of year	Current Financial Year			Mths. since start of year	Last Financial Year		
	Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)
Arcturus	2.9	—	2.0	4	12	—	12	12	—	12	12
Cam & Motor	24.0	7,441	45.1	4	96	29,509	180	96	24,440	152	152
Connaught	0.8	—	1.4	4	3	—	6	3	—	6	6
Falcon Mines	16.0	2,588	6.0	1	16	2,588	6	42*	6,484*	16*	16*
Globe & Phoenix	6.0	3,503	22.7	10	60	33,893	216	61	33,371	216	216
Motapa Gold†	20.2	2,408	2.0	10	207	23,780	13	229	23,088	7	7
Muriel Mine	2.3	—	8.2	4	7	—	28	4	—	27	27
Rezende	6.9	1,100	0.8	10	66	11,583	17	71	13,290	30	30
Tebekwe	8.3	—	2.8	4	33	—	10	31	—	12	12

\* Last year's cumulative total to date given for Oct. - Dec. quarter.

† Excluding premium gold sales.

Three of the gold producers listed in the table below, Arcturus, Muriel and Tebekwe, are owned and operated by Coronation Syndicate whose financial results for the year ended June 30, 1953, were noted in these columns in our issue of November 27.

Connaught, Rezende and Cam and Motor are in the London and Rhodesian Mining and Land group; Motapa, which was at one time thought to be a promising venture, is in the Gold Fields group; while the figures in the table relating to Falcon Mines include those obtained from Dalmy, Sunace and Bay Horse Mines. In this latter connection it is indicated in the footnote to the table that the cumulative figures for the preceding year are for the three months October-December, 1952, this particular statistical presentation being necessary as the company did not publish monthly returns for its mines until the beginning of 1953. Globe and Phoenix, which commenced crushing in 1900, works some of the highest grade ore in Southern Rhodesia.

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**Esperanza Copper's Big Profit Expansion**

The Esperanza Copper and Sulphur Company, which owns virtually the whole of the issued share capital of Cyprus Sulphur and Copper Company, has now published its report and accounts in respect of the year ended March 31 last.

The Cyprus Sulphur and Copper Company holds a lease of the Limni Section of 30 square miles, containing pyrites, gold and copper. During the year under review no development work was carried out in the Limni Mine area, although 26,569 tons of high-grade ore were shipped and during the first half of the current financial year a further 18,670 tons have been shipped. The 26,569 tons of cupreous ore shipped were extracted from the Kinousa Section of the Limni Mines where top-slice stoping methods are being used. The chairman, Mr. L. R. Jackson, in his review said that prospecting in the Evloimeni area of the Limni concession indicates a development of considerable promise, the ore so far encountered showing good values of copper, zinc and sulphur.

The profit and loss account of the Cyprus Copper and Sulphur Company for the year ended March 31 showed a net profit of £122,851 which strikingly compares with the £17,630 earned in the preceding year. The forward balance at the company's financial year end of £93,520 compared with £28,935 brought in.

The accounts of the parent company showed that a loss of £4,409 was incurred on the year's operations, which gave a total debit balance of £20,888 to be carried forward.

**Malayan Stop Press**

During the latter part of this week we received a number of reports which must await next week's issue before they can be analysed in detail. Meanwhile, we give a few of the salient features and the accounts of each company in the following note.

**Tronoh Mines.**—The net profit of Tronoh Mines, after tax and all other provisions for the year ended December 31 last, was £303,780 against £327,173. The total dividend distribution was 6s. 6d. (5s. 9d.) per 5s. share. The carry forward was £296,334 against £288,429 brought in.

**Southern Tronoh Tin Dredging.**—The net profit of Southern Tronoh Tin Dredging, after tax and all other outgoings in the year ended December 31 last, was £53,936 against £118,420. The total dividend distribution was 2s. 6d. (5s.) per 5s. share. The carry forward was £91,791, against £90,355.

**The Sungei Besi Mines.**—This company's net profit for the year ended March 31 last, after tax and all other outgoings, was £132,308 against £136,818. Total dividend distribution was 2s. 9.6d. (3s. 7.2d.) per 4s. share. The forward balance amounted to £82,688 against £71,296.

**Malayan Tin Dredging.**—Net profit for the year ended June 30 last, after tax and all other provisions, was higher at £255,923 against £208,008. The total dividend distribution was 6s. (4s. 3d.) per 5s. share. The forward balance was £220,885 against £227,358.

**Southern Malayan Tin Dredging.**—This company's net profit for the year ended June 30 last, after tax and all other outgoings, was £524,538 compared with £448,353. The total dividend distribution was 6s. (6s.) per 5s. share. The carry forward amounted to £174,523 against £148,806.

**Ayer Hitam Tin Dredging.**—The net profit of this company, after tax and all other provisions for the year ended June 30 last, was £263,212 compared with £349,697. The total dividend distribution was 5s. 6d. (5s. 6d.) per 5s. share. The carry forward was £135,757 against £129,195.

**Kepong Dredging.**—The net profit of this company, after tax and all other provisions for the year ended June 30 last, was £23,656 against £19,073. The total dividend distribution was 1s. (1s. 3d.) per 5s. share and the carry forward was £21,035 against £21,891.

**BURMA MINES LIMITED**

The following summarizes a report of the operating results of Burma Corporation (1951) Limited (Incorporated in the Union of Burma) for the three months ended June 30, 1953, together with progressive details of Ore Extraction, Production and Estimated Revenue and Expenditure for the twelve months ended June 30, 1953.

**ORE EXTRACTION**

Quarter ended September 30, 1952	...	...	...	...	...	2,088 tons
" " December 31, 1952	...	...	...	...	...	7,817 tons
" " March 31, 1953	...	...	...	...	...	9,991 tons
" " June 30, 1953	...	...	...	...	...	12,218 tons
Total for the 12 months ended June 30, 1953	...	...	...	...	...	32,114 tons

**PRODUCTION**

Marketable Products were as follows:

	Refined Lead Tons	Refined Antimonial Lead (12.109% Sb.) Tons	Refined and Doré Silver Oz.	Copper Matte Tons	Nickel Speiss Tons	Zinc Concentrates 57%-58% Zn. Tons
September 30, 1952	268	—	—	—	—	410
December 31, 1952	710	—	121,932	65	90	1,821
March 31, 1953	1,533	—	85,581	—	—	1,760
June 30, 1953	1,229	166	198,401	—	81	1,009
Totals for 12 months ended June 30, 1953	3,740	166	405,914	65	171	5,000

**ESTIMATED REVENUE AND EXPENDITURE**

	For Quarter ended June 30, 1953		For the twelve months ended June 30, 1953	
Estimated Gross Revenue	K.31,22,300	£234,172	K.82,40,600	£618,045
Estimated Operating Expenditure (after adjustment of Metal Stocks — credit K.1,80,333)	K.29,86,100	£223,957	K.1,04,59,700	£784,477
Estimated Excess of Revenue over Expenditure	K.1,36,200	£10,215	—	—
Estimated Excess of Expenditure over Revenue	—	—	K.22,19,100	£166,432
Estimated Taxation	Nil	Nil	Nil	Nil
Estimated Depreciation on Machinery and Plant	K.1,42,300	£10,672	K.4,25,500	£31,912
Capital Expenditure	K.4,78,600	£35,895	K.12,73,300	£95,497

The Sterling figures shown are based on a Rate of Exchange of 1s. 6d. per Kyat.

**GENERAL**

Mine ore extraction at 12,218 tons increased by 22.29 per cent over the previous quarter.

The number of underground workers increased slightly and the new labour force is now settling down and beginning to show increasing efficiency.

Reconditioning of No. 4 Generator (4,000 kw.) at Mansam Falls Hydro-Electric Generating Station continued satisfactorily.

37 Dover Street, London, W.1.



## THE GOLD FIELDS RHODESIAN DEVELOPMENT COMPANY, LIMITED

### MR. ROBERT ANNAN'S STATEMENT

The Annual General Meeting of The Gold Fields Rhodesian Development Co. Ltd., was held in London on December 3. Mr. Robert Annan (the Chairman) presided and the following is an extract of his statement:

The Profit and Loss Account shows a profit for the year of £65,468. In unfavourable markets the profit on sales of investments fell by £35,627 but profit on property sales rose by £27,380. Income from investments and taxation thereon shows little change. Transfer is made of £20,000 to Depreciation Reserve and £30,000 to General Reserve, leaving an Unappropriated balance of profit of £5,514. In view of cash requirements for the exercise of valuable rights and for development of mining property your directors did not feel justified in recommending the payment of a dividend.

Mining operations in Southern Rhodesia were continued by the Motapa company and by our company on the Sebakwe group of claims.

At Motapa a higher yield of gold was obtained from a slightly reduced tonnage but a rise of 3s. per ton in working costs caused a sharp drop in profits at the official price of gold. This was offset by the receipts for a full year from sales at a premium, the total profit at £33,071 comparing with £29,282 for the previous year. An extensive programme of shaft sinking to open this property at depth has been completed. This involved some reduction in the rate of lateral development. Of 3,659 feet proved on the strike of the orebodies, 1,560 feet was payable with an average value of 5.7 dwt. over a width of 10.9 feet. These results reflect a general improvement due to encouraging disclosures in depth in the Club Shaft section of the mine. Some success has also been achieved in improving metallurgical extraction and a noticeable improvement in recovery has been effected.

At the Sebakwe group our policy was to begin production on a small scale, using the proceeds for more extensive development of the property but here we have encountered several setbacks. At the outset there was difficulty in reproducing the results of preliminary tests in actual operation of the plant. Costs were higher than anticipated and there was a complete collapse in the market for the antimony concentrate which formed a substantial part of our production. In these circumstances it was decided to cease production and to continue with development and metallurgical research. The latter has been successful in effecting considerable improvement based on separate treatment of the antimonial ores which are the richer class, but difficulties in the market for antimony concentrates still persist.

The programme of development was seriously upset by the phenomenal rainfall which occurred in this district at the beginning of the year. One mine was completely flooded by an inrush of surface water and other sections were flooded to varying degrees. As a result the total development for the year was limited to 6,333 feet. Of 2,263 feet on the strike of the orebodies 590 feet proved payable, averaging 10.9 dwt. over 37 inches. Included in this is 335 feet in the Indarama section assaying 23.5 dwt. over 21 inches, carrying in addition a high proportion of antimony. Development of the higher grade sections is proceeding but development in the lower grade Beehive and Taba Mali No. 2 sections has been disappointing. To carry on this work we have had to meet the necessary expenditure out of our general funds. This amounted to £36,048 on capital and £21,223 on operating account. It should be possible to reach a decision on future production policy early in the coming year and I am proposing to visit the property at that time.

### VARIED HOLDINGS

We have a varied list of dividend-paying gold and platinum shares on which our income last year was well maintained. In addition, we have holdings in several developing mines now entering or about to enter the producing stage, from which we should derive increasing benefit in the near future.

Among the South African mines in which we are interested five are included in the scheme for production of uranium.

For many years past the Company with associates has held a small coal grant in the Tuli area at a point about 16 miles north of Beit Bridge, our proportion being 33 per cent. During last year it was decided to apply for an Exclusive Prospecting Reservation to prospect for coal over an area of 100 square miles. This was granted last April and a geological examination with a limited amount of diamond drilling is being undertaken, our associates bearing their share of the cost. This

area is close to the line which would be followed by a rail link between Beit Bridge and West Nicholson and if workable deposits of coal were to be found in this area they could hardly fail to be of considerable importance.

The results of mining in Southern Rhodesia have again been disappointing, though recently there has been some slight improvement. The position of our general investments is sound and the developing properties in which we have holdings are now all coming into production and are showing great promise.

The Report and Accounts were adopted.

## GÉOMINES

### PAST FINANCIAL YEAR REVIEWED

The Annual General Meeting of the Compagnie Géologique et Minière des Ingénieurs et Industriels Belges was held in Brussels on Tuesday, December 8, 1953. The following is a translation of the text of the directors' report which has been circulated to shareholders with the report and accounts for the year to June 30, 1953:

During the greater part of the period under review the tin market enjoyed considerable stability, the price level being maintained at around £960 per ton. However, last April prices began to fall, reaching £660 at the end of June, and dropping even lower after that date.

Among the factors depressing the market were the slowing down of stockpile purchases by the United States, and the economic policy pursued by its new Administration. The statistical position of tin has equally been a depressive factor on the market, reflecting the fact that during the past few years there has been a 25 per cent surplus of production over consumption.

The International Tin Study Group has been considering this problem. A sub-committee of the Study Group has been trying to work out a restriction scheme for world tin production, and the International Conference now meeting in Geneva under the auspices of the United Nations' Organization is endeavouring to reach agreement on this subject.

### PRODUCTION

Your company has produced 3,940 tonnes of cassiterite in the year under review, compared with 3,576 tonnes in the corresponding period a year ago.

In the period under review, 2,540 tonnes were obtained from quarrying the altered pegmatites and 1,400 tonnes (say 35½ per cent) came from mining the hard rock deposits. At the present time hard rock mining is providing about 40 per cent of output. Progress has continued to be made with the installation of new equipment.

The output of tantalum and niobium concentrates was raised to 140 tonnes.

Research into methods of working our lithium ores profitably has resulted in the development of a process for fabricating lithium carbonate. This process, which has been patented, will next be developed on a pilot plant scale.

### HYDRO-ELECTRIC PLANT

Our central hydro-electric plant at Piana produced 67,431,370 kWh. Since July, 1952, work has been actively progressing on the foundations and the other civil engineering work necessary for the extensions to this plant.

### COAL MINING

Nine thousand tonnes of coal were mined at Greinerville to meet local consumption, and at the same time improvements have been carried out on the surface plant and in the workshops. Our colliery will be able to meet any new demands made on it without difficulty.

In addition, on the initiative of the Syndicat de la Lukuga, a programme of test-drilling has been undertaken on our concession with a view to finding sufficiently substantial reserves of oil to meet the requirements of the chemical industry which is eventually to be based on our coal mine. In the course of this drilling programme, the existence of coal deposits of some tens of millions of tonnes has been proved, together with further extensions to these deposits which have not been prospected in detail.

### PERSONNEL

At the end of the year under review personnel employed by the company amounted to 149 Europeans and 6,000 natives at Manono; 5 Europeans and 132 natives at Greinerville; and 13 Europeans and 430 natives at Piana. Your directors wish to



pay tribute to the co-operation which has been shown by all members of the organization.

#### SUBSIDIARY INTERESTS

The Georunda Company produced 970 tonnes of cassiterite in 1952. These operations resulted in a gross profit of 23,774,317 fr. After providing for general expenses and taxes, together with 14,250,000 fr. for amortization, the balance of 5,854,838 fr. was appropriated to special reserve account.

The Société Minière de la Lueta paid a dividend during the year of 37 fr. net per share. In 1952 the Société Afridex recorded a profit of 5,143,000 fr. of which 5,100,000 fr. were applied to amortization.

#### THE COMPANY'S BALANCE SHEET

After deducting 82,059,682 fr. for amortization, the company's fixed assets stand in the balance sheet at 795,954,918 fr. The value of fixed assets in Africa has risen during the year by 132,000,000 fr. of which around 50,000,000 fr. represent investment in extensions to the central hydro-electric plant at Piana.

The value of stores is close to 239,000,000 fr., an increase of 25,000,000 fr. on the previous financial year.

The loan of 81,500,000 fr. from the E.C.A. has been repaid to the extent of 59,000,000 fr.

#### PROFIT AND LOSS ACCOUNT

The profit and loss account shows a profit on sales of 104,266,227 fr., while income from investments and sundry revenue amounted to 2,358,666 fr. The result of the year's workings are less favourable than during the period 1951-52, in which a net profit after tax was earned of 164,869,856 fr. This was due to increased labour costs, to expenses incurred by the cost of work on our new buildings and equipment, and also to the fall in the selling price of our mine output. After deducting general expenses, and providing for taxation, there remains a net profit of 82,059,682 fr. which your directors propose to apply entirely to amortization.

At the Annual General Meeting, two of your directors, Baron de Steenhault de Waerbeck and Monsieur P. Fontainas, and one of your auditors, Monsieur J. Dulait, retire by rotation and are eligible for re-election.

## Company Shorts

**Control of South Bukuru Passes to Parish Group.**—As the result of a poll following the extraordinary general meeting of South Bukuru Areas, held on December 8, it has been announced that the resolutions put forward by the requisitionists have been carried. The effect of these has been to remove all three existing directors from office, and to replace them by Major M. W. Parish and Messrs. H. G. Hall and C. W. Loch. These gentlemen are associated with the Parish group of companies. Since last Tuesday's meeting the shares have been a purely nominal market at around 2s. 6d. compared with a peak price of 3s. 6d. recorded in a recent period of active buying. One of the issues, upon which the resolutions put forward at the meeting were based, concerned a partial return of capital to shareholders. The new directors are understood to favour a cash distribution, but have not as yet to our knowledge, circulated any detailed proposals to shareholders.

**Gold and Base Secures New U.S. Loan.**—Gold and Base Metal Mines of Nigeria, in announcing its November production return, stated that a contract has now been signed with the United States Government whereby advances of up to £100,000 will be made to develop the Rishi columbite areas in Northern Nigeria.

**Lampa Mining Raises Dividend.**—The untaxed profit of the Lampa Mining Company, the Peruvian copper-silver producer, for the year ended June 30 last, was £40,596 against £35,491. Taxation took £16,000 (same), the provision made for Peruvian taxation was £14,066 (£11,325), and the total dividend distribution was 15 per cent (12½ per cent). The carry forward was £8,390 against £9,385. The report and accounts will be dealt with in next week's issue.

#### DIVIDENDS

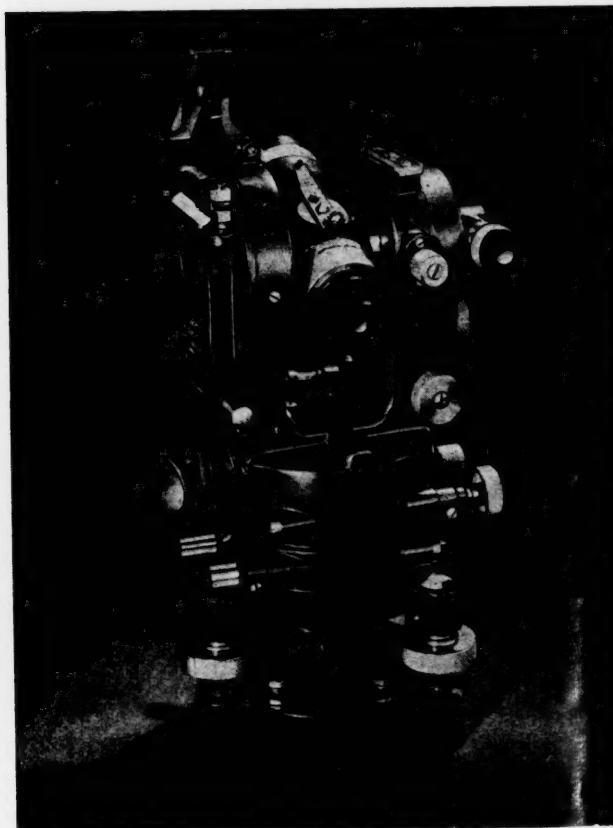
Amalgamated Tin Mines of Nigeria 8% *i* (December 19)

Gopeng Consolidated 5% *i* (December 16)

Kent (F.M.S.) Tin 15% *i* (December 30)

Kinta Tin Mines 7½% *i* (December 23)

Tanjong Tin Dredging Ltd. 7½% *i* (December 23)  
*i* interim



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### RAND MINES LIMITED

At an adjourned extraordinary general meeting of shareholders held in Johannesburg on 24th November, 1953, Mr. W. H. A. Lawrence, the Chairman, said:

This meeting has been convened for the purpose of considering and, if deemed fit, of passing a Special Resolution relating to the return of contracts referred to in Section 70 quin, subsection (9) of the Companies Act, as amended.

In terms of this subsection, your company is required to place before every Annual General Meeting a return specifying the contracts entered into by the company since the last Annual General Meeting, in respect of which any declaration of interest has been made by a director or manager of the company. The subsection provides, however, that this requirement may be dispensed with if shareholders so resolve by Special Resolution.

The contracts required to be disclosed by your company in compliance with this provision of the Act are numerous and include routine business transactions. The declarations of interest made in respect of such contracts by those of the company's directors concerned arise mainly as a result of your company being associated with companies in which these members of your Board are interested either as directors, or managers or shareholders. In the opinion of your directors, the disclosure of certain of these contracts may prejudice their outcome and adversely affect the company's business. In these circumstances your directors have concluded that it would not be in the best interests of the company to place these returns before Annual General Meetings and accordingly recommend that they be dispensed with. Shareholders will appreciate, however, that although these returns may be dispensed with, the obligation of a director or manager to disclose to the Board of Directors his interest in contracts remains unaffected.

I now move the following resolution as a Special Resolution, namely:—

"That it shall not be necessary for the Company to comply with the provisions of Subsection (9) of Section 70 quin of the Companies Act, 1926, as amended, and accordingly that the returns referred to therein be and the same are hereby dispensed with."

The motion, which was put to the meeting, was carried unanimously.

### TRANSVAAL CONSOLIDATED LAND AND EXPLORATION CO., LTD.

At an adjourned extraordinary general meeting of shareholders held in Johannesburg on 24th November, 1953, Mr. T. Reekie, the Chairman, said:

This meeting has been convened for the purpose of considering and, if deemed fit, of passing a Special Resolution relating to the return of contracts referred to in Section 70 quin, subsection (9) of the Companies Act, as amended.

In terms of this subsection, your company is required to place before every Annual General Meeting a return specifying the contracts entered into by the company since the last Annual General Meeting, in respect of which any declaration of interest has been made by a director or manager of the company. The subsection provides, however, that this requirement may be dispensed with if shareholders so resolve by Special Resolution.

The contracts required to be disclosed by your company in compliance with this provision of the Act are mostly routine business transactions. The declarations of interests made in respect of such contracts by those of the company's directors concerned arise mainly as a result of your company being associated with companies in which these members of your Board are interested, either as directors or managers or shareholders. In the opinion of your directors, the disclosure of certain of these contracts may prejudice their outcome and adversely affect the company's business. In the circumstances your directors have concluded that it would not be in the best interests of the company to place these returns before Annual General Meetings and accordingly recommend that they be dispensed with. Shareholders will appreciate, however, that although these returns may be dispensed with, the obligation of a director or manager to disclose to the Board of Directors his interest in contracts will remain unaffected.

I now move the following resolution as a Special Resolution, namely:—

"That it shall not be necessary for the Company to comply with the provisions of Subsection (9) of Section 70 quin of the Companies Act, 1926, as amended, and accordingly that the returns referred to therein be and the same are hereby dispensed with."

The motion, which was put to the meeting, was carried unanimously.



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## ANGLO AMERICAN CORPORATION OF SOUTH AFRICA, LIMITED

(Incorporated in the Union of South Africa)

### NOTICE TO HOLDERS OF 6 PER CENT CUMULATIVE PREFERRED STOCK DIVIDEND NO. 49

NOTICE IS HEREBY GIVEN that Dividend No. 49 of 3 per cent for the half-year ending December 31, 1953, being at the rate of 6 per cent per annum, has been declared payable to stockholders registered in the books of the Corporation at the close of business on December 31, 1953, and to persons presenting Coupon No. 49 from Stock Warrants to Bearer.

The dividend is declared in the currency of the Union of South Africa and becomes due on January 2, 1954. Warrants will be posted from the Head and London Offices on or about February 8, 1954.

The dividend is payable subject to the usual conditions which can be inspected at the Head and London Offices of the Corporation.

The Preferred Stock Transfer Books and Register of Members will be closed from January 1, 1954, to January 9, 1954, both days inclusive.

Holders of Stock Warrants to Bearer are notified that the dividend is payable at Barclays Bank (Dominion, Colonial and Overseas), Circus Place, London Wall, E.C.2, or at the Banque de l'Union Parisienne, 6 and 8 Boulevard Haussmann, Paris, on or about February 9, 1954. Coupons must be left four clear days for examination.

The effective rate of Non-Resident Shareholders' Tax is 6.225 per cent.

By Order of the Board,

London Office:  
11 Old Jewry, E.C.2.  
December 9, 1953.

W. E. GROVES,  
*London Secretary.*

## ANGLO AMERICAN CORPORATION GROUP OF COMPANIES

### DECLARATION OF DIVIDENDS

NOTICE IS HEREBY GIVEN that dividends have been declared payable to shareholders registered in the books of the undermentioned companies at the close of business on December 31, 1953.

The dividends are declared in the currency of the Union of South Africa and become due on January 2, 1954. Dividend warrants will be posted from the Head and London Offices on or about February 8, 1954.

The dividends are payable subject to the usual conditions which can be inspected at the Head and London Offices of the companies.

The Transfer Books and Register of Members will be closed in each case from January 1, 1954, to January 9, 1954, both days inclusive.

Holders of Share Warrants to Bearer are notified that the dividends are payable at Barclays Bank (Dominion, Colonial and Overseas), Circus Place, London Wall, E.C.2, or at the Banque de l'Union Parisienne, 6 and 8 Boulevard Haussmann, Paris, on or about February 9, 1954, the respective coupons being as set out in the following tabulation.

Name of Company (Each of which is incorporated in the Union of South Africa)	Dividend Coupon		Rate of dividend per Share in Union of South Africa currency	
	No.	No.	s.	d.
Brakpan Mines, Limited	82	82	3	6
Daggafontein Mines, Limited	42	42	3	0
East Daggafontein Mines, Limited	28	—	10	½
The South African Land and Exploration Company, Limited	31	31	1	6
Spring Mines, Limited	64	64	1	½
Western Reefs Exploration and Development Company, Limited	25	—	1	3

Note:—The effective rate of Non-Resident Shareholders' Tax for all the above companies is 7.5 per cent.

By Order of the Boards,

ANGLO AMERICAN CORPORATION OF SOUTH  
AFRICA, LIMITED.

London Offices:  
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December 9, 1953.

W. E. GROVES,  
*London Secretary.*



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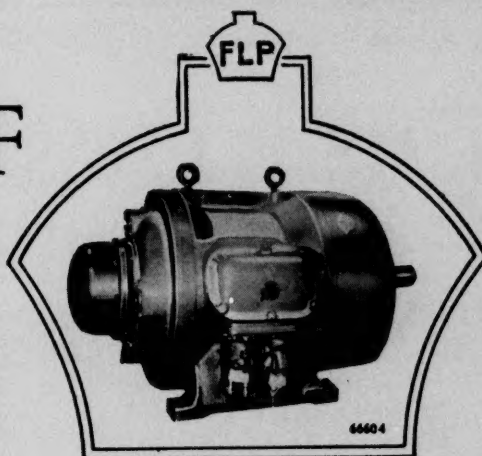
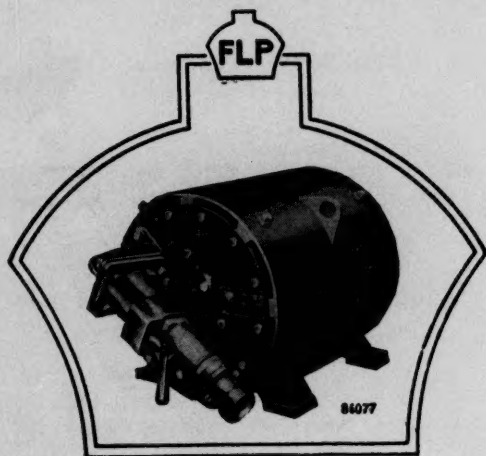
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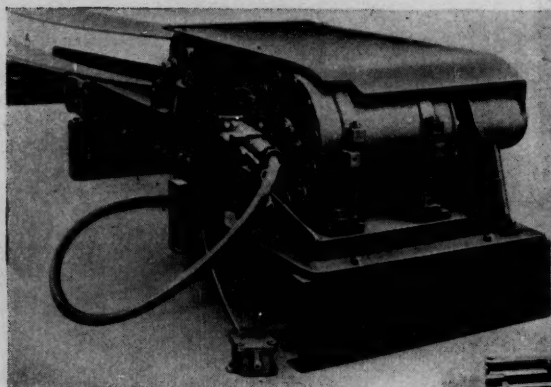
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# FLAMEPROOF



Top Left: *Totally-enclosed fan-cooled flameproof squirrel-cage motor, type KF.*  
 Top Right: *T.E.F.C. flameproof slipring motor, type FW.*

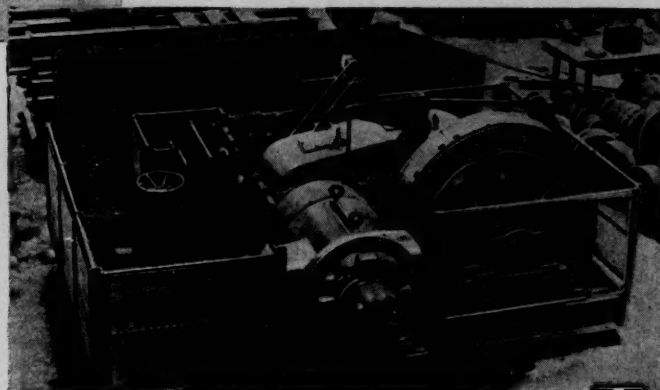
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78858

Above: *Type KF flameproof motor driving a "Huwood" conveyor.*

Right: *125 hp, 580 rpm totally-enclosed, fan-cooled, flameproof Metrovick slipring induction motor driving Beckett and Anderson "Man-Riding" haulage for a colliery. Electro-hydraulic thrustor operating main brake is seen on left of motor.*



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